

HORTICULTURAL ABSTRACTS

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Initialled abstracts and reviews not by Bureau staff are by J. W. L. Beament of Cambridge University, Miss M. Page of Wye College, R. J. Garner, D. W. P. Greenham and A. M. Massee of the East Malling Research Station, N. B. Bagenal, G. St. C. Feilden, C. W. S. Hartley and Miss J. H. Schofield.

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N.B.—Numbers sub-divided alphabetically refer to items noted but not abstracted.

MISCELLANEOUS.

General.

2194. BLAIR, I. D.

Micro-organisms and plant growth.

Tech. Publ. Lincoln Coll. N.Z. 5, 1951,
pp. 42, bibl. 153.

This is a review of the subject with the headings: the rhizosphere concept, nitrogen fixation, micro-organisms and plant nutrition, rhizosphere and fungi, soil microbiological equilibrium.

2195. TRICÂNICO, S.

Causas da floração. (The causes of flowering.)

An. Esc. sup. Agric. "Luiz de Queiroz", Piracicaba, 1949, 6: i-xvii, bibl. 16 [received 1951].

The various theories on the nature of flower induction and the literature on the subject are reviewed, and the practical applications of these theories are briefly discussed.

2196. FACCINI, G. C.

La Stazione di Wädenswil. (The Wädenswil Research Station.)

Ital. agric., 1951, 88: 215-22, illus.

An account, illustrated by 5 photographs, is given of the organization and the work carried out at the

Wädenswil experiment station for fruit-growing, viticulture and horticulture, on the shores of Lake Zurich, Switzerland.

Statistical design.

(See also 2283e, 2999, 3000.)

2197. VAN DER LAAN, E.

De betekenis van de proefveldtechniek voor het tuinbouwkundig onderzoek. (The importance of experimental technique in horticultural investigation.) [English summary 4 lines.]

Meded. Dir. Tuinb., 1950, 13: 729-34, bibl. 10.

The more important statistical methods in horticulture are summarized with examples of useful experimental designs.

2198. GOODIJK, J.

Keuze en aanleg van proefvelden. (The choice and lay-out of trial fields.)

Reprinted from Maandbl. LandbVoorlicht. Dienst, 1950, 7: 28-32.

A discussion of factors that may affect the uniformity of a trial field intended for agricultural crops or grassland.

2199. PEARCE, S. C., AND THOM, J. M. S.
The variability of apple trees. II. The optimum size for unguarded plots.
J. hort. Sci., 1951, 26: 98-108, bibl. 13.

A study is made of optimum plot size for apple experiments with no guard rows on the basis of four sets of uniformity data. It is concluded that larger plots give more information per replicate, but smaller ones give more information per tree and this is taken to be the more important consideration. Objections have been made in the past to one-tree plots on the ground that they (a) are too variable and (b) give rise to too many missing plots. Either objection may have substance in particular instances, but as a general rule one-tree plots are to be recommended. [Authors' summary.]—East Malling Research Station.

2200. TAYLOR, J.
The estimation of fruit size of cherries by sampling methods.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 93-9, bibl. 4.

The results of size sampling experiments with four varieties of cherry in 1949 and 1950 are discussed. "Layer samples" and "grab samples" from the tops of containers are described. It is found that they usually give unbiased estimates of the fruit size of the containers as a whole, and that if there is a bias it is small and uncorrelated with the size. The variability between containers and between trees is assessed. It is concluded that a good routine sampling method is to take a "grab" sample of a pound of fruit from each of two containers per tree, selected at random if possible. Accuracy might be increased by picking all trees of a replicate at about the same time. [Author's summary.]

2201. TAYLOR, J.
Statistical studies on strawberry crop and vigour measurements.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 100-7, bibl. 8.

1. The results of a uniformity trial carried out in 1934 have been re-examined; subsequent experience suggests that the plants had unusually low variability. Plots of 24 plants, in two rows of twelve, have proved useful in practice. Blocks nearly square in shape give some reduction in variability, but it is still high, about seven replicates needed if a 20% difference is to be significant at the $P=0.05$ level. 2. If treatments are not applied for about a year after planting, calibration using plant heights and spreads is an effective method of reducing variability in the subsequent crop. If the plants are de-blossomed in the first year the blossom weight may be of value, but this is less certain. If the plants are not de-blossomed the crop weight in the first year is of no value for calibration. 3. Spread records on the plants in five strawberry trials have been examined in relation to a health category record. Virus disease has some effect on spread, but not sufficient for the mean spread of all plants to be a good measure of health. It is recommended that spread records should normally be supplemented by health records and the mean spread of healthy plants only used as a measure of the size attainable by plants under the various treatments. Under the conditions of these trials, plants adjacent to missing ones do not differ in

spread from others in the same plots. [Author's summary.]

2202. STEVENS, W. L.
Análise estatística do ensaio de variedades de café. (The statistical analysis of a coffee variety trial.) [English summary 1½ pp.]
Bragantia, 1949, 9: 103-23, bibl. 4.

This paper is notable for the imaginative application of modern statistical methods to a non-randomized trial of the old type. First (and this could be done for any trial of long-lived plants), estimates are made for each plot of (i) total crop over the period, (ii) the extent of biennial oscillation and (iii) the rate of crop increase with time. Next, the non-randomness of the design is largely overcome by covariance corrections upon position in the field. S.C.P.

Meteorology and climatic effects.

(See also 2283u, 2711, 2712.)

2203. SANDERSON, M.
Some Canadian developments in agricultural climatology.
Weather, 1950, 5: 381-3, 409-12, bibl. 5, illus.

Research in climatology at the Ontario Research Foundation has been concerned with potential evapotranspiration and its computation by the Thornthwaite formula. Measurements of the daily potential evapotranspiration from grassland in Toronto (44° N.) and Norman Wells (64° 50' N., 125° 20' W.) have verified the accuracy of the formula for mid and high latitudes, and its application to irrigation schemes is discussed.

2204. TAMM, C. O.
Removal of plant nutrients from tree crowns by rain.
Physiol. Plant, 1951, 4: 184-8, bibl. 13.

Considerable amounts of Ca, K and Na were found in samples of rain water collected beneath forest trees in the autumn, together with smaller amounts of N and P.—Forest Res. Inst. Sweden.

Biochemistry.

(See also 2283j, p, r, y, 2415-17, 2839, 2850, 3012.)

2205. FARMER, V. C.
The spectrographic analysis of plant ash in the carbon arc.
Reprinted from *Spectrochimica Acta*, 1950, 4: 224-8, bibl. 6.

A spectrographic method using the cathode layer arc technique for the determination of Cu, Fe, Mn, Sr, Ba, Na, Mg and Ca in plant ashes without chemical pretreatment is reported. Potassium sulphate is used as a spectrographic buffer, while traces of Ag and Cr incorporated in the carbon powder provide internal standards for the elements determined. A method for preparing CaCO_3 free from Sr and Ba is reported. [Author's summary.]

2206. NICHOLAS, D. J. D., AND FIELDING, A. H.
The use of *Aspergillus niger* (M) for the determination of magnesium, zinc, copper and molybdenum available in soils to crop plants.
J. hort. Sci., 1951, 26: 125-47, bibl. 63, illus.

The fungus *Aspergillus niger* (Mulder's M strain) requires the following mineral elements for normal growth: nitrogen, phosphorus, potassium, magnesium, sulphur, iron, zinc, copper, manganese, molybdenum, and possibly gallium and vanadium. When one of the essential mineral elements is omitted from the culture solution, the growth of the fungus is markedly reduced, and the addition of increasing amounts of the element, from deficiency to sufficiency levels, results in an increase in dry-weight yields and sporulation. The unpurified mineral macronutrients and dextrose that ordinarily comprise culture solutions contain sufficient of the micronutrient elements to provide for the normal growth of the fungus. Therefore chemical and ion-exchange methods are used to remove the micronutrient to be determined from the mineral macronutrient and dextrose so that a standard growth series can be prepared for the "test" element, from deficiency to normal levels. A determination of the "test" nutrient is made by adding a known amount of material, e.g. soil, extracts of fresh plant tissues, to 50 ml. of culture solution containing all the mineral elements other than the one to be determined. By reference to yields of the fungus, the amount of the element present in the test substance is determined. The method has been used to determine normal and deficiency levels of magnesium, copper, zinc and molybdenum in British soils. The bioassay method for molybdenum is very sensitive, and can be used to determine levels of the element in tissue extracts and in the ash of plants which are not detected by chemical methods. [Authors' synopsis.]—Long Ashton Res. Stat. [For other accounts of this work, see *H.A.*, 21: 1256 and note 2283p in this number.]

2207. BROWN, J. G., LILLELAND, O., AND JACKSON, R. K.
Further notes on the use of flame methods for the analysis of plant material for potassium, calcium, magnesium and sodium.
Proc. Amer. Soc. hort. Sci., 1950, 56: 12-22, bibl. 1.

The operating characteristics of an improved Beckman quartz prism flame photometer and its use in the routine analysis of plant materials, particularly K, Ca, Mg and Na, are discussed. Comparative figures for analyses by the photometric and chemical methods are tabulated, from which it is seen that they can be expected to agree within 5%.

2208. MASON, A. C.
A new and rapid method for estimating small quantities of calcium in plant material. A preliminary note.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 122-3, bibl. 8.

In this method an excess of ethylenediamine tetra-acetic acid is added and back titrated with a standard calcium solution, murexide being used as indicator.

2209. CORNFIELD, A. H., AND POLLARD, A. G.
An indirect colorimetric determination of calcium in plant material.
J. Sci. Food Agric., 1951, 2: 135-6, bibl. 1.

Calcium is separated as oxalate in a centrifuge tube. The precipitate is estimated by dissolving in a known excess of ceric sulphate, excess of which is then

determined absorptiometrically. The range covered is 100-1,000 μg . calcium. [Authors' synopsis.]—Imperial College, London.

2210. GORDON, S. A., AND WEBER, R. P.
Colorimetric estimation of indoleacetic acid.
Plant Physiol., 1951, 26: 192-5, bibl. 2.

Several modifications of the ferric chloride-sulphuric acid method for the quantitative estimation of indoleacetic acid are suggested. These produce a more stable colour of increased specificity, which changes in density more rapidly with variation in IAA concentration.—Argonne nat. Lab., Chicago, Ill.

2211. MASON, A. C.
The estimation of iron in plant material.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 124-6, bibl. 3.

Sources of error inherent in micro-chemical methods for estimating iron in small quantities of plant material were investigated, and a method is outlined which, by reducing these errors, enables quantities of iron in the range 4 to 40 μg . to be estimated with a standard error of 2%. The method depends on an acid digestion of the sample and development of a colour with *aa'*-dipyridyl and concentrated hydroxylamine hydrochloride, heating in a water bath to break down un-ionized complex iron compounds.

2212. CORNFIELD, A. H., AND POLLARD, A. G.
Use of Titan yellow for the determination of magnesium in plant material.
J. Sci. Food Agric., 1950, 1: 357-8, bibl. 8.

A modification of the colorimetric determination of magnesium by means of Titan yellow, as applied to plant-ash extracts, is described, in which no preliminary separations are required; the range is from 10 to 80 μg . magnesium. [Authors' synopsis.]

2213. EVANS, H. J., PURVIS, E. R., AND BEAR, F. E.
Colorimetric determination of molybdenum by means of nitric and perchloric acids.
Analyt. Chem., 1950, 22: 1568-9, bibl. 7.

A modified method for the determination of molybdenum in materials digested in nitric and perchloric acids includes proposed modifications of the thiocyanate-stannous chloride procedure and additional ones that are necessary to adapt it for use on nitric and perchloric acid digestates. The revised procedure eliminates interference from traces of organic matter that may remain after the digestates appear colourless. It also utilizes ammonium thiocyanate instead of potassium thiocyanate, which prevents a heavy precipitate of potassium perchlorate during the determination. [Authors' summary.]

2214. POTGIETER, J. E.
A spectrochemical method for the determination of potassium in organic and biological materials.
Sci. Bull. Dep. Agric. S. Afr. 312, 1950, pp. 10, bibl. 15, illus., 3d.

A description is given of a spectrochemical method for the quantitative determination of potassium using the method of internal standards combined with the micro-photometric determination of line densities. A maximum deviation of approximately 10% of the actual potassium content could be expected. The

results obtained, however, were consistent and reproducible. [From author's summary.]—Western Province Fruit Res. Stat., Stellenbosch.

2215. SEAY, W. A., ATTOE, O. J., AND TRUOG, E.
Elimination of calcium interference in photometric determination of sodium in soils and plants.

Soil Sci., 1951, 71: 83-90, bibl. 3.

Interference of calcium in the photometric determination of sodium in soil and plant extracts was investigated, using a Perkin-Elmer flame photometer. The necessary correction for calcium interference was determined. Extractions of the soil and plant tissue are made in the presence of an excess of ammonium oxalate, causing precipitation of the calcium as the oxalate and making possible its removal by filtration from the extract.

Physiology.

(See also 2259, 2283q, w, 2340, 2370, 2372, 2571, 2759, 2762-6.)

2216. BLACKMAN, G. E., AND WILSON, G. L.
Physiological and ecological studies in the analysis of plant environment. VI. The constancy for different species of a logarithmic relationship between net assimilation rate and light intensity and its ecological significance.

Ann. Bot. Lond., 1951, 15: 63-94, bibl. 28.

A study was made of the effect of varying light intensities on the net assimilation rate of species from shady and exposed habitats, viz. *Helianthus annuus*, *Fagopyrum esculentum*, *Trifolium subterraneum*, *Tropaeolum majus*, *Lycopersicum esculentum*, *Vicia faba*, *Pisum sativum*, *Hordeum vulgare*, *Solanum dulcamara*, *Geum urbanum*. It was found that during the season of active growth the net assimilation rate was linearly related to the logarithm of the light intensity, and that the reductions in net assimilation due to shading were similar for all species. In experiments in late autumn this relationship was no longer apparent. In comparative experiments some differences were found between species in the reduction, by shading, of the net assimilation rate, and the latter was also reduced, in the case of *Pisum sativum*, by waterlogging. Warmer conditions increased the assimilation rate of *Lycopersicum esculentum* and *Helianthus annuus*, but not of *Fagopyrum esculentum*. Estimates of the compensation point showed that the amount of shade required to reduce the net assimilation rate to zero was similar for all species, though barley and bean (*Vicia faba*) needed a somewhat higher level of light intensity for assimilation to balance respiration. It was concluded that neither compensation point differences nor differences in the effect of shading on net assimilation rate could be used as a basis for grouping plants into "sun" or "shade" species.—Oxford University. C.W.S.H.

2217. JONES, M. W., KIVEL, B., AND BLESS, A. A.
The bioelectric potential of seeds as a function of growth and of X-ray dosage.

Plant Physiol., 1951, 26: 19-29, bibl. 7.

From experiments made with seeds of maize, Lady Bountiful bean and lima bean, the following conclusions are drawn: 1. The high-yielding seeds have higher

bioelectric potentials than those of low-yielding varieties. 2. The bioelectric potential of seeds is zero at dormancy and rises slowly during the first few hours in a humid environment. The potential rises much more rapidly as soon as coleoptile elongation begins. 3. The variation of bioelectric potential with X-ray dosage follows closely the variation of the length of coleoptile with dosage. X-rays, in general, decrease the bioelectric potential of plant seeds and lower their vitality. 4. The bioelectric potential is not a function of the weight of the seeds.—Univ. Florida, Gainesville.

2218. HILDITCH, T. P.

Biosynthesis of unsaturated fatty acids in ripening seeds.

Nature, 1951, 167: 298-301, bibl. 27.

(1) Each species of plant elaborates its own specific mixture of acids in its seed fat; but nearly all seed fats include considerable proportions of oleic and linoleic acids. (2) In seeds of the same species, the relative proportions of oleic and linoleic (linolenic) acids may vary considerably, and such variation is conditioned mainly by the temperature of the locality where the seed ripens. Low temperatures (and rate of development of the seed) tend to the production of a more unsaturated mixture of acids, and conversely. (3) This variation is confined to the unsaturated acids in the seed fat—in comparison, the saturated components show almost negligible variation in amount. (4) This suggests strongly that the typical unsaturated seed fatty acids are built up by a different mechanism to that which operates in the biosynthesis of the saturated acids. Moreover, the rate of the unsaturated acid synthesis *in vivo* is evidently much more affected by temperature than that of the synthesis of saturated acids. [From author's summary.]

2219. RAGGIO, M., AND RAGGIO, N. M. DE.
Recientes aplicaciones biológicas y químicas de derivados del tetrazol. (Recent biological and chemical applications of tetrazolium derivatives.)

Cien. y Invest., 1951, 7: 35-9, bibl. 54.

2,3,5-triphenyltetrazolium chloride is now considered one of the best measures of germinability of a large number of seeds. The salt is also used in the evaluation of antibiotics, in the measurement of respiration, in the determination of enzymatic activity and in the study of a variety of metabolic processes. Its use in the differentiation of normal from tumour tissue is also considered possible. The fact that the salts are apparently harmless to plant tissue and are coloured in their reduced form make them particularly valuable reagents in experimental physiology. This review of the literature is accompanied by a useful bibliography.

2220. BROWN, R.

The effects of temperature on the durations of the different stages of cell division in the root-tip.

J. exp. Bot., 1951, 2: 96-110, bibl. 12.

All five phases of cell division in the root-tip of the pea were accelerated by raising the temperature from 15° to 30° C., though between 25° and 30° C. there was little change in duration of the phases with increase in temperature. The ratios of the durations at 15° and 25° C. were about 2.0. A new method of determining durations is described.—Univ. Leeds. C.W.S.H.

2221. VIRTANEN, A. I.

Utilization of the nitrate ion by plants and its relation to the assimilation of the ammonium ion and molecular nitrogen.

Acta Agric. Scand., 1950, 1: 1: 1-19, bibl. 78, illus.

The paper was presented at the meeting of the British Association for the Advancement of Science at Newcastle-upon-Tyne in September 1949. Besides reviewing the literature the author discusses the effect of ascorbic acid on the growth of peas as determined by experiments carried out in his own laboratory at the Biochemical Institute, Helsinki.

2222. SOMERS, G. F., AND KELLY, W. C.

Ascorbic acid and dry matter accumulation in turnip and broccoli leaf discs after infiltration with inorganic salts, organic acids, and some enzyme inhibitors.

Plant Physiol., 1951, 26: 90-109, bibl. 27.

It is shown that infiltration with solutions of various inorganic salts and salts of various organic acids will influence ascorbic acid accumulation in illuminated leaf discs of turnips and broccoli. The magnitude of ascorbic acid accumulation was influenced by the nature of the ions present. 8-hydroxyquinoline, which was not ionized, reduced both ascorbic acid accumulation and net photosynthesis, each to about the same extent. In a discussion of these results, it is suggested that ascorbic acid contributes to the cation-anion balance in leaf tissue cells. The contribution may be small owing to the relatively low concentration of this acid, but the cation-anion balance may be a factor in determining the amount of ascorbic acid accumulated. Various other interpretations of the data are discussed. —U.S. Plant, Soil and Nutrition Laboratory, U.S.D.A., Ithaca, N.Y.

2223. SOMERS, G. F.

The influence of light, temperature, and some enzyme poisons upon the total organic acid content of leaf tissue of *Kalanchoe daigremontiana* (Hamet and Perrier).

Plant Physiol., 1951, 26: 1-18, bibl. 57.

1. By use of a simple titration technique, changes in the organic acid content of leaf-pieces of *Kalanchoe daigremontiana* (Hamet and Perrier) were studied. It was demonstrated that both illumination and raising the temperature cause an acid breakdown. The effects of these two factors are conditioned by the previous history of the leaf tissue. 2. Azide, cyanide, and iodoacetate when infiltrated into the tissue at a concentration of M/1,000 were found to inhibit strongly the breakdown of organic acids, both in the light and in the dark. M/1,000 fluoride produced some inhibition, but pyrophosphate had no effect. 3. Azide and iodoacetate, at a concentration of M/1,000, inhibited strongly acid accumulation in the dark. [Author's summary.]—Cornell Univ., Ithaca, N.Y.

2224. DYAR, M. T.

Some observations on starch synthesis in pea root tips.

Amer. J. Bot., 1950, 37: 786-92, bibl. 25, illus.

Some of the characteristics of starch synthesis by phosphorylase in pea root tips have been studied by

histochemical methods. Starch synthesis proceeds very readily with glucose-1-phosphate for the substrate. The root tips were not found to synthesize starch from any other substrates. The phosphorylase had the strongest activity in root cap cells, was also abundant in meristematic cells and procambium, and less so in the cortex. For the most part it occurred in localized areas in the cytoplasm but also occurred in the nuclei of some of the meristematic cells in the tip region. The distribution of the enzyme acid phosphatase within the cells was found to differ from that of phosphorylase. The type of polysaccharide synthesized, judged by the iodine color, was quite different in various parts of the root tip. Even starved root tips did not require priming for the reaction to take place. However, frozen sections soaked in water lost their activity which could be regained by adding starch, glycogen, or dextrans to the substrate. Considerably more starch was formed at temperatures of 30°-40° C. than at lower temperatures even when the root tips were incubated in the substrate for proportionately longer times at the lower temperatures. The penetration of glucose-1-phosphate through cell membranes was found to be a pronounced limiting factor in starch synthesis by uninjured root tips. The phosphorylase activity was inhibited by iodine, phosphate, and onion juice, whereas a variety of common enzyme inhibitors or activators had no effect. [From author's summary.]—University of Washington.

2225. VOSKRESENSKAJA, N. P.

The effect of long-wave radiation on the production of carbohydrates and proteins in leaves. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1950, 72: 173-6, bibl. 11.

Data are tabulated for maize, sunflower, and bean (*Phaseolus*). The accumulation of dry matter and of carbohydrates by severed leaves proceeds most intensively during exposure to radiation from the long-wave portion of the spectrum. The synthesis of proteins in the absence of CO₂ at the expense of carbohydrates does not occur either in red or in blue radiation.

2226. ČAILAHJAN, M. H.

The part played by roots in the photoperiodic reaction of plants. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1950, 72: 201-4, bibl. 5, illus.

From the experiments described it is concluded that, in the short-day plant *Perilla nankinensis*, the photoperiodic reaction proceeds independently of root action, that *Brassica crenata*, a long-day plant, develops a stem under short-day conditions, is less susceptible to the action of long-day illumination, and the reaction is independent of root action, and that *Rudbeckia bicolor*, a typical long-day plant, develops only a rosette form in short-day illumination, and the photoperiodic reaction only operates when roots are present and functioning.

2227. WILLIAMS, W. T.

Studies in stomatal behaviour. III. The sensitivity of stomata to mechanical shock. Part 2. True shock-phenomena and their implications.

J. exp. Bot., 1951, 2: 86-95, bibl. 13.

Pelargonium zonale leaves, subjected to mechanical shock by a sharp pressure from the forefinger, showed

a marked acceleration of stomatal closure when the porometer-cups used were immediately darkened by placing a halfpenny over them. The effect persisted for 18 hours. When a light period of 2 hours followed shock, closure was decelerated. These effects are discussed in their relation to respiration, and it is postulated that the effects can be explained on the basis of shock-induced respiratory changes.—Bedford College, London.

C.W.S.H.

2228. ARONOFF, S.

Chlorophyll.

Bot. Rev., 1950, **16**: 525-88, bibl. 243, being

Contr. Inst. Atomic Res. and Dep. Bot.,

la St. Coll. **132**.

This review summarizes the present state of knowledge concerning chlorophyll, its types, relation to other photosynthetic pigments, occurrence and physiological role. The various theories put forward on the precursors of chlorophyll in plant tissues are described and discussed in some detail.

2229. HOLT, A. S., SMITH, R. F., AND FRENCH, C. S.

Dye reduction by illuminated chloroplast fragments.

Plant Physiol., 1951, **26**: 164-73, bibl. 13.

The rate of reduction of dilute solutions of indophenol dyes can be used as a quantitative index of photochemical activity of micro quantities of chloroplast material. The methods, conditions and apparatus used are described. Leaves from Swiss chard or spinach were used as a source of chloroplasts.—Univ. Minnesota, Minneapolis and Oak Ridge nat. Lab., Tennessee.

2230. FREELAND, R. O.

Green pigments in guard cells.

From abstr. in *Amer. J. Bot.*, 1950, **37**: 677.

All previous investigations have failed to yield positive evidence that the green pigments in guard cells are chlorophylls. The results of a spectrophotometric examination of the green pigment extracted from the guard cells of leaves of *Hymenocallis littoralis* indicated that this was largely chlorophyll *a*.—Northwestern Univ., Evanston, Ill.

2231. STRAUS, W.

Microscopic structure of carrot chromoplasts.

Science, 1950, **112**: 745-8, bibl. 13, illus.

A new method [not described] has made it possible to separate the chromoplasts from almost all cytoplasmic granules, the resulting preparation containing 20-50% carotene. An interpretation is given of the structure of the chromoplasts with the aid of microphotographs. It is suggested that these carotene bodies may bear a relationship to the inclusion bodies of virus-infected cells. In addition the grana observed in the plastids may be compared to the chromomeres of chromosomes and to the chromidia which are said to form basic units of cytoplasmic fibrils.

Water relations.

(See also 3060.)

2232. HYGEN, G.

Studies in plant transpiration I.

Physiol. Plant., 1951, **4**: 57-183, bibl. 63.

The purpose of this investigation was to develop a simple method of obtaining consistent and reproducible data which may serve as a reliable basis for characterization and comparison of the transpiring properties of plants, including the total amount of transpiration loss under defined conditions and the effectiveness of the transpiration-regulating mechanisms. The problems involved are discussed and the method finally adopted is described. In order to test the practical value of the method, numerous experiments were carried out with morphologically and ecologically different species. *Vaccinium myrtillus* was chosen as the main test object, and the present paper deals exclusively with the transpiration of blueberry plants from a small mountainous area around Haugseter in Norway. The remaining material will be dealt with in subsequent papers. The value of the method as a means of investigating the ecological adaptability of different species is pointed out.—Univ. Oslo.

Growth substances.

(See also 2210, 2283d, h, i, m, o, t, 2342-59, 2362, 2394, 2688, 2745, 2746, 2757, 2758, 2921, 2922, 2951, 3010.)

2233. DE BOER, S.

Groeistoffen en haar toepassing in de tuinbouw. (Growth substances and their application in horticulture.) [English summary $\frac{1}{2}$ p.]

Meded. Dir. Tuinb., 1950, **13**: 656-71, bibl. 50, illus.

A survey is given of the history of growth substances and of their use. Twelve horticultural applications are mentioned and the more important ones enlarged upon.

2234. KENT, M., AND GORTNER, W. A.

Effect of pre-illumination on the response of split pea stems to growth substances.

Bot. Gaz., 1951, **112**: 307-11, bibl. 12, being

Tech. Pap. Pineapple Res. Inst. Hawaii **184**.

Anomalies in the response of split stems of Alaska peas to auxins are attributed to differential exposure to light. Pre-illumination was found to increase the response considerably, exposure to red light for 4 hours before testing producing the maximum effect.

2235. JACOBS, W. P.

Control of elongation in the bean hypocotyl by the ability of the hypocotyl tip to transport auxin.

Amer. J. Bot., 1950, **37**: 551-5, bibl. 11.

Two regions of maximum elongation were found in the developing hypocotyls of seedlings of red kidney beans. The first was at the very top of the hypocotyl in the very early stages (2-3 days after germination). As the first waned, a second developed near the base of the hypocotyl bend, becoming clearly dominant by 6-7 days. Evidence is presented to show that elongation of the second region is limited primarily by auxin, that this auxin probably comes from the cotyledons and/or epicotyl, and that the gradually-overcome inability of the hypocotyl tips to transport auxin from the cotyledons and/or epicotyl to the second region acts as an indirect limiting factor on the elongation of that second region. The more basal regions of the 6-day hypocotyl, which have more or less ceased growth, are not limited

in their elongation by auxin and/or sucrose. [Author's summary.]—Princeton Univ., N.J.

2236. SIEGEL, S. M.

Plant-growth inhibitors from red kidney bean seeds.

Science, 1950, **112**: 754-5, bibl. 4.

Purple fractions obtained from the seed coats of red kidney beans by extraction with ether have been shown to exert an inhibiting effect on the emergence of flax seeds. Evidence is presented which suggests that a relationship may exist between the purple coloration of the ether fractions and at least some of the inhibitory activity of the extracts. Both light and alkali destroyed the pigment and diminished biological activity. [See also *H.A.*, 20: 2251.]

2237. BROWN, H. S., AND ADDICOTT, F. T.

The anatomy of experimental leaflet abscission in *Phaseolus vulgaris*.

Amer. J. Bot., 1950, **37**: 650-6, bibl. 11, illus.

Anatomical changes associated with leaflet abscission in the Black Valentine bean were studied in debladed leaves on the plant and in explants from leaves. In explants, immediately following excision, starch rapidly disappeared from all tissues except those of the abscission zone. In the abscission zone starch was retained. In a layer one or two cells wide across the abscission zone cell division occurred. The resulting new cells formed the abscission layer. Cytolysis and disintegration of the cells of the abscission layer led to separation of pulvinus from stalk. Separation was facilitated by compression in the cortex and tension in the vascular cylinder of the pulvinus. A callus-like tissue developed on the separation surface of the stalk. Application of water maintained the turgor and the consequent tension and compression within the pulvinus and delayed cell division. Sucrose solutions led to an unusual concentration of starch in the stalk and delayed cell division and vascular changes. Application of 2,4-D delayed all anatomical changes. Phenylmercury oleate accelerated the loss of pulvinal turgor and accelerated cellular disintegration. Ethylene led to rapid cellular disintegration in the abscission zone and in scattered regions of the pulvinal cortex adjacent to the vascular cylinder. There was no cell division after ethylene treatment. During abscission of debladed leaves in the greenhouse the pulvinus lost turgor rapidly and separation occurred first in the periphery of the abscission layer. Dissolution of cell walls was observed in localized regions of the parenchyma of the stalk in the vicinity of the abscission zone. The significance of water relations in abscission, the occurrence of cell wall digestion, and physiological differences between the leaflet pulvinus and the leaf stalk are discussed. [Authors' summary.]—Univ. Calif., Los Angeles.

2238. SHOJI, K., ADDICOTT, F. T., AND SWETS, W. A.

Auxin in relation to leaf blade abscission.

Plant Physiol., 1951, **26**: 189-91, bibl. 5.

In order to test the theory that a decrease in the naturally occurring auxin present in an organ precedes or accompanies abscission, determinations were made of the auxin content of leaves of Black Valentine beans of various ages. It was found that the immature

blades, as compared with the corresponding stalks, had a high concentration of auxin. By the 30th day from planting, when the leaves were fully expanded, their auxin concentration had dropped to a level which stayed constant up to the 60th day. By the 70th day, when the leaves showed signs of approaching abscission, their auxin content had dropped to the level shown by the stalks. In the stalks a similar but lower level curve of auxin concentration was maintained until the 60th day, but this did not show a drop at the approach of abscission. Thus there is an auxin gradient across the abscission zone while the leaf is active, and this gradient is lost immediately preceding abscission.—Univ. Calif., Los Angeles.

2239. WAIN, R. L.

Plant growth-regulating and systemic fungicidal activity: the aryloxyalkylcarboxylic acids.

J. Sci. Food Agric., 1951, **2**: 101-6, bibl. 51.

An account is given of the effect of the various additions and substitutions in the constitution of these chemicals on their growth regulating activity, and fungicidal properties.

2240. DOXEY, D., AND RHODES, A.

The effects of the gamma isomer of benzene hexachloride (hexachlorocyclohexane) on plant growth and on mitosis.

Ann. Bot. Lond., 1951, **15**: 47-52, bibl. 9.

Gamma-BHC did not affect the growth of cress roots, but in two experiments the growth of wheat roots was significantly reduced. Stimulation of root growth of wheat by a low concentration (0.1% gamma isomer in dust) was not obtained consistently and was not therefore considered significant. Mitotic aberrations were induced in wheat and rye by concentrations similar to those inducing growth retardation, and the growth-inhibiting and mitotic actions of gamma-BHC were therefore considered to be causally related. The cytological effects were similar to those of colchicine and other compounds, and they included spindle inhibition resulting in scattered chromosomes, polyploidy and enlarged and irregularly shaped nuclei.—I.C.I. Jealott's Hill Res. Stat. C.W.S.H.

2241. MINARIK, C. E., AND READY, D.

Growth regulating activity of substituted benzoic acid derivatives.

From abstr. in *Amer. J. Bot.*, 1950, **37**: 680.

Several hundred benzoic acid derivatives have been examined for growth-regulating activity and approximately 25 were found capable of inducing curvature and formative effects. In general, the most active derivatives contain at least two substituents in the ring. Most of the active compounds tested contain halogen substituents although certain non-halogen radicals are also able to confer activity. The witches' broom appearance of bean plants which is induced by triiodobenzoic acid can also be induced by a fairly large number of related compounds. Gall formation in the hypocotyl or apical meristem occurs quite frequently in response to treatment. Bean plants treated with certain benzoic acid derivatives continue to produce malformed leaves over a longer period of time than do similar plants treated with 2,4-D. Some evidence is available that certain benzoic acid derivatives can antagonize 2,4-D.—Camp Detrick, Frederick, Md.

2242. ASHBY, W. C.

Effects of certain acid growth-regulating substances and their corresponding aldehydes on the growth of roots.

Bot. Gaz., 1951, 112: 237-50, bibl. 33.

At the Hull Botanical Laboratory the effects of growth-regulating substances were assessed by measuring the elongation of seedling roots of *Artemisia absinthium*. 3-indoleacetic acid, 3-indole acetaldehyde, 1-naphthaleneacetic acid, and 1-naphthalene acetaldehyde dissolved in agar were compared and the root growth at 4 and 24 hours plotted against the concentration of the reagents. All four substances inhibited growth within certain ranges of concentration, the aldehydes being in general one-tenth as effective as the corresponding acids, while 1-naphthalene acetaldehyde was one-tenth as effective as 3-indole acetaldehyde. It was also established that juice from *Artemisia* was able to convert 1-naphthalene acetaldehyde into 1-naphthaleneacetic acid. All four substances were found to have formative effects in high concentrations; root elongation virtually stopped, root hair production diminished, and subterminal swellings appeared.

2243. LEAPER, J. M. F., AND BISHOP, J. R.

Relation of halogen position to physiological properties in the mono-, di-, and trichlorophenoxyacetic acids.

Bot. Gaz., 1951, 112: 250-8, bibl. 24.

1. All the mono-, di-, and trichlorophenoxyacetic acids have been prepared in the highest possible purity, and their melting points have been recorded. Their corresponding amides and anilides have also been made, and their melting points recorded. Four of these acids, ten of the amides, and eleven of the anilides have not previously been reported. 2. All these chlorophenoxyacetic acids, including the four not hitherto tested, have been subjected to selective "hormone" screening tests with tomato plants and also to the root-inhibition test using *Lupinus albus*. 3. The highest physiological activity of chlorophenoxyacetic acids has been shown to be associated with the presence of two unsubstituted positions in the benzene ring para to each other. 4. The possibility of the formation of compounds having quinonoid structure being connected with their maximum herbicidal potency is discussed. [From authors' summary.]

2244. JAGENDORF, A. T., AND BONNER, D. M.

The induction of atypical growth of cabbage roots by p-Cl-phenoxyacetic acid.

From abstr. in *Amer. J. Bot.*, 1950, 37: 679.

Young cabbage seedlings grown in sterile culture on an agar medium containing sucrose, vitamins, and salts, produce atypical outgrowths when both p-chlorophenoxyacetic acid (10^{-6}) and an additional nitrogen source are present in the medium. Under these conditions the new root growth assumes the form of plates of fasciated roots and/or tumour-like proliferating masses. All the substituted phenoxyacetic compounds tested induce this phenomenon, while indoleacetic acid and several other synthetic hormones do not. Yeast extract (0.3 mg./cc.), NH_4Cl , asparagine, arginine, and proline (9×10^{-3} M) are effective nitrogen sources, while, in general, none of the other amino acids nor nitrate ions in high concentration are associated with atypical growth. The tumefacient effect is

completely prevented by the presence in the medium of some glycolytic and respiratory intermediates at $3-9 \times 10^{-2}$ M concentration. Effective compounds are: glucose-1-phosphate, 2-glycerophosphate, acetate, pyruvate, succinate, fumarate, and malate. Reversal of this inhibitive effect can be obtained by either increasing the level of the nitrogen source or by increasing the hormone content of the medium.—Yale Univ., New Haven, Conn.

2245. HARTMAN, R. T., AND PRICE, W. C.

Synergistic effect of plant growth substances and southern bean mosaic virus.

Amer. J. Bot., 1950, 37: 820-8, bibl. 17, illus.

From experiments using the garden bean variety Bountiful and China aster plants, it has been shown that there is a synergistic effect between beta-naphthoxyacetic acid, 2,4-D, or parachlorophenoxyacetic acid on the one hand and southern bean mosaic (SBM) virus or aster yellows virus on the other. This synergistic effect increased with increasing concentration of the growth substances. The viruses studied induced growth of axillary branches on infected plants, but treatment with an appropriate concentration of growth substance tended to counterbalance this effect. Possible reasons for this are suggested. In bean plants treated with beta-naphthoxyacetic acid at different intervals after inoculation with SBM virus, activity of the virus was decreased when treatment followed inoculation by 1 day but was greatly increased when treatment was delayed for 15 days after inoculation. These results suggest that, although the growth substance hinders virus multiplication, it also delays maturation of the host tissue so that multiplication of virus can continue for a much longer time.—Univ. Pittsburgh, Pa.

2246. WEINTRAUB, R. L., AND BROWN, J. W.

Influence of temperature on formative response of bean seedlings to 2,4-dichlorophenoxyacetic acid.

Abstr. in *Amer. J. Bot.*, 1950, 37: 682.

Expansion of the first trifoliate leaf of the bean seedling exhibits a sharp temperature optimum at approximately 31°C . Expansion is repressed by application of 2,4-dichlorophenoxyacetic acid (2,4-D) directly to the bud; the degree of repression is proportional to the logarithm of the dose of 2,4-D. The percentage repression due to a particular dose is constant over the range $22^\circ-34^\circ\text{C}$., indicating that no temperature-limited process is involved in the inhibition. Repression of the trifoliate leaf is induced also by application of 2,4-D to the primary leaves, but the dose-response curve in this mode of treatment differs greatly from that of direct application; it is composed of two distinct segments, in which response is a function of dosage, connected by a plateau in which response is independent of dose. This indicates the participation of an additional physiological process not involved in the response to direct application. The process in question is temperature-sensitive and exhibits a temperature coefficient less than unity. The most obvious process which may be suggested as meeting these requirements is that of translocation, although other possibilities, such as starch-sugar conversion, also exist.—Camp Detrick, Frederick, Md.

2247. EAMES, A. J.

Destruction of phloem in young bean plants after treatment with 2,4-D.*Amer. J. Bot.*, 1950, 37: 840-7, bibl. 9, illus.

A histological study was made of the origin and development of the sheath of proliferating tissue formed in the hypocotyl of red kidney bean seedlings after treatment with 2,4-D, special attention being paid to the effect on the phloem. It was found that all tissues between the cortex and primary xylem were involved. In the primary phloem, which was mature at the time of treatment, the parenchyma cells proliferated freely, disrupting the phloem strands and crushing the companion cells and smaller sieve tubes. After 8-13 days no phloem, as such, was present in the hypocotyl. No secondary phloem was formed because only initials of this tissue were present at the time of treatment, and these became part of the proliferating tissue. It is concluded that destruction of the phloem is probably a contributing factor in the killing of bean plants with 2,4-D.—Cornell Univ., N.Y.

2248. WILDE, M. H.

Anatomical modifications of bean roots following treatment with 2,4-D.*Amer. J. Bot.*, 1951, 38: 79-91, bibl. 9, illus.

Soil applications of 2,4-D (5 mg. 2,4-D in Carbowax in 30 ml. water) to red kidney bean plants checked root elongation and resulted in the production of an abnormal number of lateral roots on the immature, and to some extent on the mature, parts of the root. Abnormal swellings were produced behind the root tips. An anatomical study was made of these structural abnormalities, and the results are correlated with those of other investigators. It is concluded that all root tip enlargements, whether the result of cell enlargement or cell proliferation, are caused by a stimulus to the normal activity of meristematic cells. The severity of the effect varies with the substance used and with the kind of plant and its age. In *Phaseolus*, in addition to the stimulus to meristematic cells of the root tip, the pericycle in mature areas of the root is also stimulated and produces additional lateral roots.—Univ. Texas, El Paso.

2249. KELLY, S., AND AVERY, G. S., Jr.

The age of pea tissue and other factors influencing the respiratory response to 2,4-dichlorophenoxyacetic acid and dinitro compounds.*Amer. J. Bot.*, 1951, 38: 1-5, bibl. 13.

In concentrations of 0.01-10.0 mg./l., 2,4-D is found to stimulate respiration of rapidly growing stem tissue of Alaska pea. Maximum stimulation occurs at a concentration of 0.1 mg./l. and is 35% over the control. At 100 mg./l. respiration is inhibited. Respiration of older pea stem tissue that has ceased to elongate is relatively unaffected by 2,4-D except at concentrations of 0.1 mg./l. and above, which are inhibitory. Greater stimulation of respiration by 2,4-D is brought about in starved than in unstarved pea stem tissue. Pea stem tissue is affected by 2,4-dinitro-o-cyclohexylphenol (DNP) in the same concentrations that *Avena* coleoptile tissue is, and to the same extent, i.e. stimulated at 1 mg./l. and inhibited at 5 mg./l. Pea tissue respiration is not affected by

2,4-dinitro-o-cresol (DNC) except at concentrations of 1 mg./l. and higher, which are inhibitory. Respiratory responses of pea stem tissue to DNP are affected by the relative proportion of freshly-cut tissue surface, whereas the responses to 2,4-D are independent of cut surface exposed, indicating a difference in penetration behaviour of the two compounds. [From authors' summary.]—Vassar College, Poughkeepsie, N.Y. and Brooklyn Bot. Gdn, N.Y.

2250. WORT, D. J.

The effect of some chemical growth regulators on the vitamin content of plants.*Proc. and Abstr. 4th west. Canad. Weed Control Conf.*, Saskatchewan, 1950, pp. 45-6.

Growth substances in minute doses can increase the vitamin content of plants, while larger applications reduce it. At the University of British Columbia the use of 250 p.p.m. ammonium 2,4-D on pods of dwarf French kidney beans 4 days before harvest reduced the ascorbic acid content of the pods, measured periodically during 9 days of storage. Whole bean plants sprayed with 500 p.p.m. ammonium 2,4-D showed reduced ascorbic acid content of both leaves and stems. In trials with buckwheat (*Fagopyrum esculentum*) comparatively large amounts of 2,4-D caused first an increase and later a decrease of carotene and ascorbic acid in the leaves. An increase in the ascorbic acid in the leaves of both plants followed treatment with 10 µg.

2251. STAHLER, L. M., AND WHITEHEAD, E. I.

The effect of 2,4-D on potassium nitrate levels in leaves of sugar beets.*Science*, 1950, 112: 749-51, bibl. 11.

Whereas the potassium nitrate in dry leaves of normal sugar beet averaged 0.22%, on 7 farms, where 2,4-D had been accidentally applied the average level was 4.5% with a variation of 1.81-8.77. It is pointed out that all the 2,4-D treated samples showed KNO₃ levels well above the minimum lethal concentration.

2252. CURRIER, H. B., DAY, B. E., AND CRAFTS, A. S.

Some effects of maleic hydrazide on plants.*Bot. Gaz.*, 1951, 112: 272-80, bibl. 22, illus.

The effects of treating mustard, barley and red kidney beans with maleic hydrazide alone and in combination with 2,4-D were investigated at the University of California. Young barley plants sprayed with maleic hydrazide showed a decrease in fresh weight, but an increase in dry weight, the increase being due to accumulation of fructosan polysaccharides. 2,4-D was found to be antagonistic to maleic hydrazide in barley and in beans, in which the maleic hydrazide treatment caused starch accumulation. No abnormal callus formation on sieve plates was observed. Possible mechanisms of action of maleic hydrazide are discussed.

Colchicine.

(See also 2838.)

2253. NORTEN, H. T.

Alterations in the structural viscosity of protoplasm by colchicine and their relationship to c-mitosis and c-tumor formation.*Amer. J. Bot.*, 1950, 37: 705-11, bibl. 23, illus., being *Contr. Dep. Bot. Rocky Mount. Herb.*, Univ. Wyo. 217.

In experiments carried out at the University of Wyoming on onion root tip cells, aqueous solutions of colchicine in concentrations between 0.01 and 0.1% decreased the structural viscosity of the spindle substance and cytoplasm. The decrease in the viscosity of the cytoplasm was most pronounced after exposures of 24 hours or longer, and was paralleled by c-tumour formation. It is suggested that the decrease in structural viscosity was the result of a dissociation of protoplasmic proteins, which in the spindle substance was considered to be the primary cause of the arrest of mitosis at metaphase, and in cytoplasm the primary cause of c-tumours.

Radioactive materials.

(See also 3058.)

2254. MERICLE, L. W.

Micro-radioautographic technique for translocation and accumulation studies.

From abstr. in *Amer. J. Bot.*, 1950, 37: 665.

Radioautographs can be used as a valuable aid in the study of translocation and tissue metabolism in plant material by utilizing nuclear track plates designed for tracking very weak beta radiation. Very satisfactory radioautographs of microscopical sections have been prepared with slight deviations from standard histological procedures. These micro-radioautographs show relative utilization of the radioactive element within the growing and differentiating tissues. Radioactive sectioned material is in place directly above the radioautograph, therefore the microscopic section and its radioautograph can be studied by a slight change in the focus of the microscope. A sealed apparatus was especially designed for growing seedling plants by liquid culture techniques so that the roots could be grown sealed off from the shoots. Shoots were allowed to photosynthesize for 24-28 hrs. within an atmosphere containing radioactive carbon (C^{14}) as a component of the carbon dioxide. Samples of root-tips were taken at different intervals and analysed for C^{14} synthesis. Root-tips were sectioned by standard histological procedures. Selected sections were then transferred in a photographic darkroom to 1×3 in. nuclear track plates (Eastman NTB-2) and stored in a light-tight lead-lined box for exposure. After exposure the plates were removed and developed, keeping the sectioned material in place on the slides. The slides were then stained by standard techniques and mounted in clarite. Translocation and accumulation of carbon-containing compounds by the various root tissues (as evidenced by their radiation patterns) vary greatly. Tissues within different regions of the same root, as well as homologous tissues from different roots sampled at regular intervals after exposure to C^{14} , show complex changeable radioactive patterns.—Mich. St. Coll., E. Lansing.

2255. WEINTRAUB, R. L., AND OTHERS.

Production of $C^{14}O_2$ from labeled 2,4-dichlorophenoxyacetic acid by plants.

From abstr. in *Amer. J. Bot.*, 1950, 37: 682.

$C^{14}O_2$ is produced by bean seedlings or parts thereof to which have been applied 2,4-D containing C^{14} in either the carboxyl or the methylene position. The

yields of $C^{14}O_2$ from the carboxyl-labelled 2,4-D are approximately three times as great as from the methylene-labelled compound. These results can be interpreted on the basis of a scheme in which acetic acid is derived from the 2,4-D side chain and enters into the tricarboxylic acid cycle.—Camp Detrick, Frederick, Md, and Tracerlab, Inc., Boston, Mass.

2256. MACEWAN, A. M.

The effects of differences in transpiration rates of individual leaves on their rates of accumulation of P^{32} .

From abstr. in *Amer. J. Bot.*, 1950, 37: 680.

Plants were grown in nutrient solutions containing P^{32} . Transpiration rates of individual attached leaves were modified by enclosing the leaves in chambers with controlled humidity. It was found that the rates of accumulation of P^{32} in the leaves could be increased or decreased several fold by increasing or decreasing the humidity.—Univ. Miss. Columbia.

Mineral nutrition.

(See also 2204, 2917, 2918, 3066, 3100.)

2257. ROBINSON, W. O., WHETSTONE, R. R., AND EDGINGTON, G.

The occurrence of barium in soils and plants.

Tech. Bull. U.S. Dep. Agric. 1013, 1950, pp. 36, bibl. 51.

Barium, in the order of a few hundred p.p.m., is probably a normal constituent of all soils. The quantity varies a great deal. The most fertile of the high barium soils are those derived from limestone. Barium appears to be a normal constituent of plant tissue in widely varying quantities. A table shows the barium oxide contents, recorded in the literature, of various plants including apple, banana, bean, beet, blackberry, boxelder, Brazil nuts, cabbage, carrot, cherry, grape, hazel, mulberry, onion, pea, pear, plum, potato, raspberry and tobacco.

Water, sand and tissue cultures.

(See also 2283b.)

2258. NILSSON, P. E.

An improved device for aseptic cultivation of higher plants.

Ann. roy. agric. Coll. Sweden, 1950, 17: 358-60, bibl. 2, illus.

In a study of the effect of root excretions on other organisms the cultivation of higher plants under aseptic conditions became essential. The apparatus used is illustrated by a line drawing and two photographic plates. The advantages claimed for this improved method of aseptic cultivation are: (1) Good possibilities of preventing infected seeds from being introduced into the main part of the apparatus. (2) Comparatively normal conditions for the plant during its development. (3) Comfortable taking of samples during the cultivation without disturbing the plant and without risk of infection. (4) Good possibilities of studying the influence of different species of organisms on each other by co-cultivation.—Inst. of Microbiology.

2259. STEINBERG, R. A.

Flowering responses of a variety of *Nicotiana rustica* to organic compounds in aseptically culture.

Amer. J. Bot., 1950, 37: 547-51, bibl. 7, illus.

A method for testing the action of organic compounds on flowering of a higher plant has been developed. Aseptic conditions are used and the plants grown at an illumination of 500 f.c. and a temperature of 25° C. A large variety of organic compounds normally present in plants were tested for their effect on flowering with a *Nicotiana rustica* Link variety. The compounds included sugars, amino acids, vitamins, purines, pyrimidines, and miscellaneous compounds. An inhibitive action on flowering was caused by sucrose (180 g./l.), D-mannose (10 g./l.), l(-)-leucine (200 p.p.m.) and l(+)-isoleucine (50 p.p.m.). Increase in number of leaves formed prior to formation of the first flower was used as a measure of inhibition. Sucrose in moderate concentrations led to an acceleration in reproductive response. Miscellaneous experiments on the influence of environmental factors agreed with the conclusion that a photochemical reaction was the basis for reproduction in plants. Toxicity responses to amino acids were similar to those of varieties of *N. tabacum*, with two outstanding exceptions, l-tyrosine was exceptionally toxic, and l-leucine could produce symptoms of frenching as well as l-isoleucine. [Authors summary.]—Div. Tob. Medicinal and Special Crops, Beltsville, Md.

2260. MOREL, G., AND WETMORE, R. H.

Fern callus tissue culture.

Amer. J. Bot., 1951, 38: 141-3, bibl. 18, illus.

Spores of *Osmunda cinnamomea* L. germinated on Knudson's medium developed into the usual heart-shaped, thin, green prothalli. Five produced green calluses on the upper surfaces after 2 months. These calluses grew slowly or died on this medium. When transferred to the same medium supplemented by B-vitamins in appropriate concentrations the calluses grew rapidly and continue to do so. The calluses were of nodular masses of large-celled parenchyma in the centre of each of which is an islet of meristematic tissue. Certain of the older parenchyma cells form tracheids. Chromosomal studies show the prothallial callus to be haploid. It is suggested that the presence of tracheary tissue in the independent prothalli of vascular cryptogams is therefore not by itself sufficient evidence that apogamy is an accompanying phenomenon. Only one callus has so far been experimentally induced on prothalli of *Osmunda*. [Authors' summary.]—Harvard Univ., Cambridge, Mass.

2261. MOREL, G., AND WETMORE, R. H.

Tissue culture of monocotyledons.

Amer. J. Bot., 1951, 38: 138-40, bibl. 10, illus.

Until now no one has been successful in obtaining a callus or root tissue culture of any monocotyledon. The authors describe the method by which they obtained the proliferation *in vitro* of tissue from the underground stem tuber of *Amorphophallus rivieri* (Araceae) on Gautheret's medium with the addition of naphthaleneacetic acid and several B-vitamins. In order to ensure proliferation for a potentially unlimited

period the addition of milk from immature coconuts appeared to be necessary.—Harvard Univ., Cambridge, Mass.

2262. LEVINE, M.

Differentiation of carrot segments grown *in vitro* as influenced by growth substances.

From abstr. in *Amer. J. Bot.*, 1950, 37: 664.

Carrot slices taken from the tap root were placed on standard medium, medium with coconut milk (CM), medium with indoleacetic acid (IAA 10^{-7} and 5×10^{-6}), and medium with a combination of CM and IAA. Discs grown on standard medium produced a crown of callus tissue over the cambial zone. Segments transferred to or grown on IAA medium produced callus over the cut apical surfaces of the tissue. Accelerated growth was produced when the standard medium was combined with CM and IAA. In only one instance were plantlets produced from the callus on the apical surface of the segment. In other instances hyaline tissue masses were formed on one side of the segment after growth on IAA. When these segments were transplanted to standard medium, plantlets were formed two transplant generations later. The development of a tissue mass from the vertical wall of a segment suggests the de-differentiation of the emerging secondary roots from the disc to form a tissue mass and the subsequent differentiation of its meristem. Exposed secondary roots on the apical surfaces were not observed. [See also *H.A.*, 21: 1263, and next abstract.]

2263. LEVINE, M.

The effect of growth substances and chemical carcinogens on fibrous roots of carrot tissue grown *in vitro*.

Amer. J. Bot., 1951, 38: 132-8, bibl. 13, illus.

Fibrous roots from carrot tissue cultures grown on standard media increase in length, produce secondary roots, but fail to develop buds which form cauline elements. Fibrous roots seeded on media with indoleacetic acid (IAA) 5 mg./l. produce hyaline calluses along the length of the root. The length of this root increases little, but from the calluses new roots are formed. Coconut milk (CM) incorporated in standard media has little effect on growth of excised fibrous roots. CM in combination with IAA produces opaque pigmented nodular masses which fuse to cover the upper surface of the cultured excised fibrous root. Microscopic sections of the hyaline tissue masses reveal the de-differentiation of the root tissue with the formation of primordia surrounded by loose cells, probably epidermal proliferations. Microscopic sections of the nodular callus formed on fibrous roots after CM with IAA had been added show somewhat organized parenchymatous cells with aberrant centres consisting of lignified cells. The chemical carcinogens used in these studies stimulate root growth but produce no calluses. Hyaline calluses separated and planted on standard media differentiate in the absence of IAA. The nodular type of growth when grown on media free of IAA differentiates. When seeded on CM the growth is rapid and abundant but differentiation is retarded and the plantlets formed frequently lack vigour. Tissue calluses differentiate freely on media with the carcinogens used. Indoleacetic acid (5 mg./l.)

hastens the formation of cauline initials from excised fibrous roots of the carrot. Their development occurs when the influence of the growth substance becomes attenuated or when freed from the IAA by transfer to media lacking it. [From author's summary.]—Montefiore Hospital, N.Y.

2264. BRAUN, A. C., AND MOREL, G.
A comparison of normal, habituated, and crown-gall tumor tissue implants in the European grape.
Amer. J. Bot., 1950, 37: 499-501, bibl. 15, illus.

It has been shown that normal plant cells isolated from the cambium and grown on a culture medium supplemented with growth substances can be cultivated indefinitely, and, further, that following prolonged exposure to growth substances their metabolism is so altered that they become capable of growing indefinitely on a medium free of added growth substances. These fully habituated cells develop in culture in a manner similar to that of bacteria-free crown-gall tumour cells. A study was made to determine whether the habituated cells, like crown-gall tumour cells, show autonomy with resulting tumour formation when fragments of these tissues are implanted into a healthy host. Normal, habituated and crown-gall tissues of the European grape variety Aramon were implanted into healthy vine plants. It was found that, while crown-gall tumour tissue developed into a large, rapidly growing neoplasm, the habituated tissue was far more completely controlled by the growth-restraining influences of the host. It is concluded that the difference between crown-gall tumour tissue and habituated tissue may either be a question of degree of cellular alteration or may be of a more fundamental nature. In the latter case, the two kinds of tissue may be the result of distinct basic mechanisms or the presence of two distinct growth substances.—Rockefeller Inst. Medical Res. and Harvard University, Cambridge, Mass.

2265. LEVINE, M.
Response of fibrous roots of sunflower and tobacco tissue cultures to plant growth substances.

Bot. Gaz., 1951, 112: 281-9, bibl. 14, illus.

Fibrous roots from tissue cultures of *Helianthus annuus* var. Russian, *Nicotiana affinis* and the hybrid *N. glauca* × *N. langsdorffii*, grown *in vitro* were treated with indoleacetic acid, chemical carcinogens (3,4-benzpyrene, 1,2,5,6-dibenzanthracene, and 20-methylcholanthrene) and coconut milk singly and in combination. Growth was stimulated only by the chemical carcinogens, while indoleacetic acid caused hyaline, jelly-like calluses from which secondary roots appeared. Coconut milk affected only the roots of the hybrid tobacco inducing tawny-coloured or tomentose-covered calluses. Excised calluses of these fibrous roots planted on standard media with agents were studied. Subsequent transplants of these cultures to media deprived of indoleacetic acid produced completely differentiated plantlets. It is concluded that tissue mass grown *in vitro* may produce organs (roots), which in turn may be induced to produce tissue mass capable of differentiating complete plantlets. [From author's summary.]—Montefiore Hospital, New York.

2266. LEE, A. E.
The influence of various sugars on the growth in culture of intact seedlings and isolated seedling organs.

Amer. J. Bot., 1950, 37: 528-33, bibl. 27.

Experiments were carried out which permitted a comparison of the growth in culture of organs of tomato seedlings, both attached to the plant and isolated from it. These seedlings and seedling organs were cultured in a basic medium with equimolecular concentrations of maltose, glucose, levulose, raffinose, and arabinose substituted for 2% sucrose. The growth of intact plants and the sum of the growth of isolated parts which would make up entire plants show greater values in the sucrose medium than with any of the other sugars. Both intact plant stems and isolated stems had greater growth values in the sucrose medium than with any of the other sugars. Cotyledons of intact plants and isolated cotyledons showed higher growth values in the medium with glucose or levulose than in the medium with sucrose. In the maltose medium the results were variable, but with the slight suggestion that both intact plant cotyledons and isolated cotyledons may grow better in the maltose medium as compared with the sucrose medium. Isolated roots showed higher growth values in the sucrose medium than in media with other sugars. These differences were, in most cases, small. Intact plant roots showed more variable responses to the maltose or glucose media than to the sucrose medium, but showed higher growth value in the levulose medium than in the sucrose medium. In general, there was no growth, or growth of all of the organs was very poor, when raffinose or arabinose was substituted for sucrose in the medium. Factors involved in these response differences are discussed.—Plant Res. Inst., Univ. Texas, and Clayton Foundation for Research.

2267. HILDEBRANDT, A. C., AND RIKER, A. J.
Growth of plant tissue *in vitro* influenced by the concentration of sugars and polysaccharides.

From abstr. in *Amer. J. Bot.*, 1950, 37: 678-9.

Bacteria-free tissues from marigold, Paris daisy, periwinkle, and sunflower crown galls and from a tobacco hybrid were incubated *in vitro* on synthetic media containing various concentrations of 9 sugars, starch, dextrin or pectin. The net weights of tissue produced are recorded.—Univ. Wisconsin, Madison.

Practical devices.

- (See also 2283k, 1, 2370, 2379, 2434, 2435, 2878.)

2268. VILLIERS, F. H., AND DIXON, T. V.
Mechanical aids to nursery work.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 201-2, illus.

Brief descriptions with photographs are given of three implements used at the research station for lifting nursery trees and rootstocks, bedding in rootstocks, and grubbing stool and layer beds.

2269. DAVIS, J. F., AND OTHERS.
A transplanter fertilizer-placement attachment designed for organic soil investigations.
Quart. Bull. Mich. agric. Exp. Stat., 1951, 33: 257-61, illus.

The authors describe fertilizer placement equipment mounted on a 2-row, self-propelled, self-guiding celery transplanter used for experimental work. The use of the machine for other crops is also suggested.

2270. ANON.

Un pal injecteur mécanisé pour l'agriculture et l'horticulture. (A mechanical injector-lance for use in agriculture and horticulture.)

Courr. hort., 1950, 12: 538-9, illus.

A mechanical soil injector for subsoil applications of insecticides or fertilizers, which is drawn by a tractor or by horses, is described, with details of its construction and performance.

2271. L., F. W.

Soil blocks.

Gdnrs' Chron., 1951, 129: 76, illus.

The advantages of raising seedlings and rooting cuttings in soil blocks are enumerated.

2272. ANON.

Peat pots give good results.

Grower, 1951, 35: 815, illus.

Pots, 2 to 2½ in. across, cut from solid peat, are being tested commercially for raising tomatoes. Their advantages and disadvantages as compared with soil blocks are outlined.

2273. DERMINE, E., AND PAQUES, M.

Reparlons un peu des explosifs. (Explosives.)

Fruit belge, 1951, 19: 17-21; 43-5, illus.

The advantages of using explosives for clearing ground of trees and for making holes when planting fruit trees are discussed. The striking differences in the development of trees of the same age planted in holes made by explosives and in holes dug by hand are illustrated.

2274. ANDISON, H.

A home-made sprayer for attachment to a tractor power take-off.

Processed Publ. Canada Dep. Agric. Div. Ent. 119, 1951, pp. 11, illus.

A sprayer designed at the Dominion Fruit Insect Laboratory, Victoria, B.C., and costing \$80 to \$100 for parts is described with the aid of illustrations. It consists of a small rotary gear pump operated from the power take-off spline on the tractor, a 45 gal. oil drum, and 2 adjustable spray booms each fitted with 3 nozzles, which are slung between the tractor wheels in a position where they can be readily seen by the driver. With pressures ranging up to 400 lb. the sprayer is suitable for use in row crops or shrubs or for applying herbicides.

2275. MARKE, D. J. B., AND LILLY, C. H.

Smoke generators for the dispersion of pesticides.

J. Sci. Food Agric., 1951, 2: 56-65, bibl. 27, illus.

The use of self-sustained gas-producing reactions of such materials as ammonium nitrate, guanidine nitrate, and nitroguanidine, with various sensitizers, for the dispersion of benzene hexachloride and other pesticides is described. The optimum mixtures of gas-producing component, sensitizer, and pesticide to give easy initiation, complete propagation, and high volatilization-efficiency have been investigated. A laboratory

method for the biological assessment of the smoke deposits is given. The particle size, persistence, and settling time of these deposits, their distribution over horizontal, inverted horizontal, and vertical surfaces, and the relative toxicity of different types of surface have been studied. The design for manufacture of smoke generators based on these principles is discussed. [Authors' synopsis.]—I.C.I.

2276. LEVIN, J. H., AND GASTON, H. P.

A hand-operated mechanical aid for dumping fruit.

Quart. Bull. Mich. agric. Exp. Stat. 1951, 33: 193-8, illus.

The apparatus described lifts and empties crates, the operation being assisted by means of springs. It is claimed that over 200 bushels of fruit per hour can be handled with a more uniform rate of delivery to the graders and a reduction in bruising. The dumper has so far been tested mainly with apples, but it is expected to handle peaches, pears, onions and other produce satisfactorily.

2277. CHADWICK, S. H.

The loading ramp.

Essex Fmrs' J., 1951, 30: 2: 16-18, illus.

The construction of loading ramps used in an Essex apple orchard to reduce fruit handling is described. One ramp served by 12 sledges or trolleys each carrying 1½ tons of fruit is suggested for each 50 acres of fruit, and a saving of 30% in labour and 50% in time is claimed.

2278. NAVÉLLIER, E.

Les matières plastiques et les fruits. (Plastic materials and fruits.)

Fruits d'Outre Mer, 1950, 5: 294-301, illus.

This is an account of the possible uses to which the plastics polyvinyl chloride and polyethylene may be put in the fruit industry, particularly for making pipes for irrigation and spraying operations and containers for preparations used in horticulture.—I.F.A.C.

2279. GILMORE, A. E.

Photography of orchard trees.

Proc. Amer. Soc. hort. Sci., 1950, 56: 242-7, bibl. 1, illus.

Since 1940 flashlight photography after dark has been used at the University of California where clear and detailed photographs of orchards are desired. The method used and its advantages are described, and several illustrations are presented comparing daylight and flashlight photographs of individual trees.

2280. BARER, R., AND SAUNDERS-SINGER, A. E.

A low-power micromanipulator and micro-dissector.

J. sci. Instrum., 1951, 28: 65-8, bibl. 5, illus.

The instrument is completely three-dimensional, will follow a movement of the hand with a reduction ratio of 4 to 1, and will "stay put" in any position. It is intended for use at magnifications up to 200 times.

2281. HILLIER, J.

On the sharpening of microtome knives for ultra-thin sectioning.

Rev. sci. Instrum., 1951, 22: 185-8, bibl. 3, illus.

Conventional methods of sharpening involve extensive grinding which is primarily for the removal of large nicks but which serves the additional purpose of fitting the knife to the sharpening means. Since large nicks rarely occur in ultra-thin microtomy, the grinding would become unnecessary if the fitting of the knife to the sharpening means could be made permanent. A permanently attached short sharpening back is described which makes this possible. Using the finest abrasives and polishing powders and prepared glass plates as the sharpening surfaces, it is possible to resharpen a knife in less than ten minutes. The method is described in detail. [Author's synopsis.]

2282. YOUNG, R. E., AND BIALE, J. B.

The recording Beckman oxygen analyzer for respiration studies.

From abstr. in *Amer. J. Bot.*, 1950, 37: 683.

Determination of respiratory activity of stored fruit is generally made by measurements of carbon dioxide evolution by any of several methods, some automatic and recording. However, when fruit is stored in atmospheres high in carbon dioxide none of these methods is fully satisfactory. Development of the Model G-2 Beckman Oxygen Analyzer made it possible to use oxygen absorption as an index of respiratory activity of composite samples. This instrument determines the magnetic susceptibility of gas sample and is adaptable to automatic recording of oxygen uptake. A valve was constructed which alternately samples gas supply lines leading to and leading from as many as twenty-four jars of fruit. Determinations of oxygen absorption are made correct to 0.01% oxygen anywhere in the range of 0-25%.—Univ. of Calif., Los Angeles.

Noted.

2283.

a BALDINI, E.

Culture senza terreno. (Soil-less culture.) *Riv. Ortoflorofruttic. ital.*, 1951, 35: 33-7, illus.

b BRUNE, W.

Construção de arejador simples para soluções nutritivas. (The construction of a simple aerator for nutrient solutions.) *Rev. Ceres*, 1950, 8: 233-6, bibl. 2, illus.

c BURSTRÖM, H.

Studies on growth and metabolism of roots. V. Cell elongation and dry matter content. *Physiol. Plant.*, 1951, 4: 199-208, bibl. 10. Using wheat plants.—Bot. Lab., Lund.

d CHAMPION, J.

Les phytohormones et leurs applications. (Plant hormones and their applications.) *Terre maroc.*, 1950, 24: 269-80, 313-28, 357-69.

e CLEM, M. A., AND FEDERER, W. T.

Random arrangements for lattice designs. *Spec. Rep. 1a agric. Exp. Stat.* 5, 1950, pp. 151, bibl. 16.

f DERMEN, H., AND SCOTT, D. H.

Chromosome counts in apple and strawberry aided by paradichlorobenzene. *Proc. Amer. Soc. hort. Sci.*, 1950, 56: 145-8, bibl. 4.

g DUCKE, A.

Notas sobre a flora neotrópica—II. As leguminosas da Amazônia brasileira. (Notes on the neotropic flora II. The leguminosae of the Brazilian Amazon.) *Bol. téc. Inst. agron. Norte, Belém* 18, 1949, pp. 249, bibl. 65.

h GALSTON, A. W., BONNER, J., AND BAKER, R. S.

Flavoprotein and peroxidase as constituents of the indoleacetic acid oxidase of peas. From abstr. in *Amer. J. Bot.*, 1950, 37: 677-8.

i GORDON, S. A., AND WEBER, R. P.

The effect of X-radiation on indoleacetic acid and auxin levels in the plant. From abstr. in *Amer. J. Bot.*, 1950, 37: 678.

j GRIDGEMAN, N. T.

Bibliography on carotene estimation, with special reference to green-leaf material. *Analyst*, 1950, 75: 574-6, bibl. 97.

k HAUER, A.

A new recording raingauge. *J. sci. Instrum.*, 1951, 28: 84-5, bibl. 2, illus. An automatic siphon raingauge is described.

l JOHNSON, C. M., STOUT, P. R., AND PEARSON, G. A.

Constant-temperature baths for use in freezing-point measurements. *Plant Physiol.*, 1951, 26: 196-7, bibl. 1. Of soils, soil solutions and plant extracts.

m LARSEN, P.

Quantitative relationships in the enzymatic conversion of indole- and naphthalene-acetaldehydes to auxins. From abstr. in *Amer. J. Bot.*, 1950, 37: 680.

n LEVINE, M.

Bacteria-free plant tumor tissue compared cytologically with tissues influenced by chemical carcinogens grown *in vitro*. From abstr. in *Amer. J. Bot.*, 1950, 37: 664. Crown gall tissue of sunflower and periwinkle and callus tissue of carrot.

o NAYLOR, A. W.

Some effects of growth substances on floral initiation and development in *Xanthium*. From abstr. in *Amer. J. Bot.*, 1950, 37: 681.

p NICHOLAS, D. J. D.

Use of *Aspergillus niger* for determining magnesium, copper, zinc and molybdenum in soils. *J. Sci. Food Agric.*, 1950, 1: 339-44, bibl. 39, illus. See also *H.A.*, 21: 1256 and 2206.

- q NISSEN, T. V.
Lidt om C-vitaminets betydning i plante-verden. (On the significance of vitamin C in plant development.)
Naturens Verden, 1950, 34: 197-202, bibl. 2.
- r NOGGLE, G. R., AND BOLOMEY, R. A.
The biosynthesis of carbon-14-labeled compounds. I. The chromatographic separation of glucose and fructose.
Plant Physiol., 1951, 26: 174-81, bibl. 10, illus.
- s VAN DE PLASSCHE, A. W., AND OTHERS.
Tuinbouw in Zwitserland, Frankrijk, Scandinavië en Engeland. (Horticulture in Switzerland, France, Scandinavia and England.)
Suppl. Meded. Dir. Tuinb., 1950, pp. 397, illus.
Reports of study travels undertaken during 1946-1949.
- t POHL, R.
Die Inaktivierung des Maisskutellum-Hemmstoffes durch Koleoptilspitzen. (The inactivation of the growth inhibitor in the maize scutellum by *Avena* coleoptiles.)
Biol. Zbl., 1951, 70: 285-91, bibl. 6.
- u PRESTON, A. P.
Weather conditions during 1950.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 90-2.
- v EL RIDI, M. S., MOUBASHER, R., AND HASSAN, Z.
Spectrophotometric assay of ascorbic acid with peri-naphthindanetrione hydrate.
Science, 1950, 112: 751-2, bibl. 3.
- w SHIELDS, L. M.
Leaf xeromorphy as related to physiological and structural influences.
Bot. Rev., 1950, 16: 399-447, bibl. 258, illus.
A comprehensive review.
- x TEILLARD, —,
Description d'un appareil destiné à l'expérimentation sur les gelées printanières afin de contrôler les réactions des bourgeons de vigne et de déterminer l'action des différentes causes d'abaissement de la température. Premiers essais. (Description of an apparatus for experiments on spring frosts, to control the reactions of vine buds, and to determine the action of the different causes of the lowering of temperatures. First trials.)
C.R. Acad. Agric. Fr., 1950, 36: 630-3.
- y TRISTRAM, G. R.
Amino acid analysis.
Chem. Industr., 1950, No. 53, pp. S 868-73, bibl. 25.
- z ULRICH, R.
La dégagement d'éthylène par les fruits. (The emission of ethylene by fruits.)
Fruits d'Outre Mer, 1950, 5: 359-64, bibl. 29.
A review.

TREE FRUITS, DECIDUOUS.

General.

(See also 3094, 3121, 3127, 3131.)

2284. SALISBURY, Sir E.
The fruit tree and its environment.*
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 59-9.

In this review of the effect of environment on fruit trees attention is called to many factors, e.g. interaction of stock and scion, soil conditions, effect of root space, root spread and root competition, fruit tree nutrition, trace elements, placement of mineral fertilizers, biennial bearing, effect of weather and micro-climate (particularly with reference to differentiation of flower buds, time of flowering, frost damage) and windbreaks.

2285. BARNETT, R. J.
Growing an orchard in Kansas.
Bull. Kans. agric. Exp. Stat. 337, 1950, pp. 48, illus.

This bulletin, written primarily for the intending commercial grower, deals with the tree fruit geography of Kansas, locating the orchard, orchard costs and yields, tree fruit varieties, buying trees, planting the orchard, care of the young orchard, injury by cold, orchard sanitation, feeding and intercropping young orchards, fruits other than apple (sour cherry, peach, plum, pear, quince) and thinning the fruit. Apple and sour cherry are the leading fruits. Orchard soil management is the most important problem under Kansas conditions. Clean cultivation during the growing period combined with cover cropping from

August to May is considered to be the ideal system. Long term experiments have proved winter vetch and rye to be the most valuable cover crops for young orchards in Kansas. Contour planting and terracing are recommended where erosion is serious.

2286. EVREINOFF, V. A.
Osservazioni biologiche sull'albicocco. (Biological observations on the apricot.)
Humus, 1951, 7: 3: 18-20.

This is an account of the distribution of the apricot and of the elevations at which it grows. Its resistance to drought and cold makes it suitable for cultivation in northern latitudes. The special characters of the species are set out with notes on rootstocks.

2287. BROOKS, R. M.
Sweet cherry production problems in California.
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 136-46, illus.

Notes are included on distribution, acreages, production and utilization, the 3 rootstocks used (mazzard, mahaleb and Stockton morello), mineral deficiencies, cultural practices, pruning, pests and diseases, together with descriptions of 21 varieties.

2288. MORETTINI, A.
Per l'incremento della coltura delle varietà di olivi da mensa. (To increase table olive production [in Italy].) [English summary 10 lines.]
Riv. Ortoflorofruttic. ital., 1951, 35: 1-18, illus.

* Amos Memorial Lecture.

The reasons for the low production of table olives in Italy are examined. The climatic and soil conditions of Spain, Greece, California and Algeria, where there is high production of olives, are compared with those of the chief Italian centres (Ascoli Piceno, Puglia, Sicily). The low production in Italy is attributed to poor planting and cultural practices. The trees should be planted in fertile soils, irrigated where necessary in summer, and they should be given the same care as other fruit orchards.

2289. HAVIS, L., AND OTHERS.

Peach growing east of the Rocky Mountains.
Fmrs' Bull. U.S. Dep. Agric. 2021, 1951,
pp. 54, illus.

Notes are given on 48 varieties grown commercially east of the Rockies, in order of ripening. Elberta, Halehaven and Golden Jubilee are the most widely grown. Propagation is described and the planting of 1-year-old trees is recommended. Other aspects dealt with include pruning and training, soil management, fruit thinning, frost injury to buds, wood and roots, handling, transport and storage, and pest and disease control.

2290. BLAIR, D. S.

Plum culture in the less favourable parts of eastern Canada.
Publ. Canada Dep. Agric. 849, 1950, pp. 14,
illus.

The better quality European and Japanese plum varieties are not sufficiently hardy to withstand the winters of the colder regions of Canada. *Nigra* and *americana* varieties can be grown, but these are of poor quality, and it is the new hybrid varieties, crosses between native and Japanese types, that appear most promising. These hybrids, however, require cross-pollination, and American plums or apricot-plum hybrids are recommended as pollinators. In addition to a list of suitable varieties, directions are given for propagation, planting, pruning, soil management, thinning and harvesting.

2291. SCARAMUZZI, F.

Il cotogno in Puglia. (The quince in Puglia.)
Ital. agric., 1951, 88: 156-64, illus.

After a brief introduction on the origin and distribution of the quince, its cultivation and yields in various parts of Italy are given, with special reference to Puglia where over 50% of Italy's quinces are produced. Particular varieties grown are mentioned and illustrated.

Breeding and varieties.

(See also 2375h, k, 3135.)

2292. ALDERMAN, W. H.

New Minnesota fruits for 1951.

Amer. Nurserym., 1951, 93: 8: 13-14, 29-31.

Notes are given on the Northstar and No. 66 cherries, the Lakeland, Oriole, Beacon, Minjon and Redwell apples, No. 69 currant, Minnesota 321 raspberry and Minnesota 206 gooseberry.

2293. ROSSI, F.

La mela Conventina. (The apple variety Conventina.)
Ital. agric., 1951, 88: 229-36, bibl. 10, illus.

A morphological and phenological study of the apple Conventina, a variety grown mostly in the Italian province of Umbria.

2294. FOGLE, H. W.

Winter hardiness of apricot variety crosses.
Proc. 46th annu. Mtg Wash. St. hort. Ass.,
1950, pp. 19-23.

In breeding trials to develop suitable varieties for the Pacific Northwest, Riland and Perfection appeared to be the best of the 6 varieties used, either as ♂ or ♀ parents, for transmitting hardiness.

2295. GERRITSEN, C. J.

Rassenkeus en rentabiliteit van de kersen-teelt. (The choice of varieties in relation to profits in cherry growing.)
Fruittelct. 1950, 40: 496-8, 552-4, illus.

This article discusses the economics of cherry growing in the Netherlands, with notes on 23 varieties.

2296. BATI, M. B.

L'ambiente fisico e la scelta delle varietà di olivo. (The physical environment and the selection of olives.)
Ann. Fac. Agrar., Perugia, 1943, 2: 115-63
[received 1951].

In relation to the selection of olives for cultivation in Italy the following factors are discussed: climate, rainfall, temperature, temperature in relation to infestation by the olive fly (*Dacus oleae*), the effect of microclimate on the plant, on yield and quality of the oil, as affected by altitude, direction of slope, and the soil.

2297. ANON.

Olive trees for shade.

Agric. Gaz. N.S.W., 1950, 61: 533.

Plantings of olives for shade along headlands or in odd corners cannot be expected to crop regularly, but occasional crops worth harvesting may be obtained. For shade purposes the following varieties are recommended: Corregiola (oil type), Nevadillo Blanco (mainly for oil), Mission (dual-purpose type), Sevillano (pickling type).

2298. CAPUCCI, C.

Le selezioni di pesco "C. Capucci". (Peach varieties selected by C. Capucci.)
[English summary 9 lines.]
Riv. Ortoflorofruttic. ital., 1950, 34: 167-76,
bibl. 2, illus.

The chief characters of 18 peach varieties selected by the author from 1942 to 1948 among plants raised from seed are described. Most of them ripen in July and August and in a few cases earlier, and have proved to be vigorous and fruitful, with white or yellow flesh, and the endocarp loosely clinging to the stone.

2299. RICCI, A.

Un'ottima pesca precoce: Madame Kira Evreinoff. (An excellent early peach: Madame Kira Evreinoff.)
Riv. Fruttic., 1950, 12: 239-42, bibl. 2, illus.

This variety, introduced into Italy from France in 1934, has proved to be one of the best early peaches. In Italy 200 hectares are planted with it.

Morphology and growth.

2300. POWERS, E., AND GUARD, A. T.

A study of the primary tissues of the apple root.

From abstr. in *Amer. J. Bot.*, 1950, 37: 666.

It is generally considered that the pericycle of the apple root develops as a double layer, the inside layer being normal pericycle and the outside layer becoming thickened. The authors show that the pericycle is a uniseriate layer, the second layer being endodermis and not thick-walled pericycle. The next layer, previously thought to be endodermis, is now considered as cortical tissue with peculiar thickenings on the radial walls. These thickenings are similar to those found in the hypodermis of other roots and should not be considered as casparian strips.—Purdue Univ., Lafayette, Ind.

2301. USHIROZAWA, K., AND FUKUSHIMA, S.

On the time of flower-bud differentiation of the chief apple varieties. [Japanese, English summary $\frac{1}{2}$ p.]

J. hort. Ass. Japan, 1950, 19: 125-33, bibl. 8, illus.

In 1947 and 1948 the initiation and development of the fruit buds of the 11 chief apple varieties in Japan were examined during late June to late August at the Aomori Apple Experiment Station. The varieties which form their floral organs early in the period are Yellow Transparent, Early McIntosh, McIntosh Red, Indo and American Summer Pearmain. Then follow Golden Delicious, Ralls Janet, and Newtown Pippin, and the latest are Delicious, Winesap, and Jonathan. Each variety has its own period of bud formation and its own rate of development.

2302. CRINS, W. H.

De diktegroei der vruchten van appels en peren en de resultaten van dunning der vruchten. (The swelling process of the fruits of apples and pears and the effect of fruit-thinning.) [English summary $\frac{1}{2}$ p.]

Meded. Dir. Tuinb., 1950, 13: 405-11.

An investigation at Maastricht showed that: (1) The fruits swelled rather regularly from the date of the first measurement. (2) In 1949 no effect was noticeable of weather conditions on the increase in size. (3) With all varieties, decline in the rate of swelling was noticeable as they approached maturity. (4) The specific gravity changed little or not at all during the growing season in 1949, except with Yellow Transparent. (5) The yield was decreased by picking the fruit one week earlier than is common practice. (6) Fruit thinning favourably affected the size of the fruits.

2303. KROTKOV, G., WILSON, D. G., AND STREET, R. W.

Acid metabolism of McIntosh apples during their development on the tree and in cold storage.

Canad. J. Bot.,* 1951, 29: 79-90, bibl. 11.

1. Various stages of the acid metabolism in an apple fruit correspond chronologically very closely with those of carbohydrates and with respiration. 2. During the first 4 to 6 weeks after the drop of petals, the pH of the apple fruit juice is rapidly falling. It reaches the

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value of about 2.8, and then slowly goes up in a straight line for the rest of the ontogeny. On account of this regularity, once the pH of the juice has begun to increase, its magnitude represents a better indicator of the ontogenetic stage of an apple fruit than its respiratory rate and either carbohydrate or acid content. 3. At the time of petal fall organic acids other than malic predominate. During the first 2 to 4 weeks of fruit development this relationship is reversed, and at the end of this period malic acid forms close to 80% of the total organic acids. It stays at this value for the rest of the ontogeny. 4. No disappearance of organic acids was observed during the climacteric rise in the sugar content of fruits, and no accumulation in the immediate post-climacteric period when large amounts of sugars disappear. It is concluded, therefore, that these variations in the sugars are not brought about by their appearance from or disappearance into organic acids. [Authors' summary.]—Queen's Univ., Kingston, Ontario.

2304. HULME, A. C.

The relation between the rate of respiration of an apple fruit and its content of protein.

I. The value of this relation immediately after picking.

J. hort. Sci., 1951, 26: 118-24, bibl. 5.

From about 60 days after petal fall until the onset of the respiration climacteric the rate of respiration of an apple on the tree is proportional to its protein content. With less developed apples the ratio rate of respiration to protein content (R/P ratio) appears to be falling from a relatively high value a few days after petal fall. In mature, pre-climacteric apples the R/P ratio is approximately constant for a given variety. It is suggested that the R/P ratio has a value characteristic of a variety and that the value tends to be higher for dessert varieties of apples than for culinary ones.—Ditton Laboratory.

2305. SISAKJAN, N. M., AND RUBIN, B. A.

Inactivation of peroxidase with age in apple-tree leaves. [Russian. English summary, 7 lines.]

Biohimija, 1944, 9: 307-11, bibl. 8 [received 1951].

The activity of peroxidase and polyphenoloxidase was determined in apple leaves taken at different levels on the shoot and therefore of different ages. The activity of peroxidase decreases with age, while that of polyphenoloxidase increases.

2306. PETRUCCI, V. E., AND CRANE, J. C.

Fruit bud initiation and differentiation in the fig.

Proc. Amer. Soc. hort. Sci., 1950, 56: 86-92, bibl. 2, illus.

The data on fruit bud formation in the Mission fig indicate that inflorescence initiation and differentiation occur in the terminal buds of the young shoots throughout the growing season, which is a period from 1 April to about 15 July. Breba figs are produced from buds all of which differentiate the year previous to fruit maturity. Second crop figs, on the other hand, may be produced either from buds differentiated the year previous or from buds differentiated during the season in which the fruit matures. The most productive part

of the shoot is the portion consisting of the third to the fifth node from the base, the buds on the basal and distal portions of the shoots being the least productive. [Authors' summary.]—Univ. Calif.

2307. CRANE, J. C., AND BROWN, J. G.
Growth of the fig fruit, *Ficus carica* var. Mission.
Proc. Amer. Soc. hort. Sci., 1950, 56: 93-7, bibl. 8.

Three phases were noted in the growth of second-crop Mission fig fruits in California during 1948. The first phase, lasting 5 to 6 weeks, was characterized by a rapid increase in diameter, a rather less rapid increase in moisture content and fresh and dry weights, and a comparatively slow accumulation of sugars. In the second phase, lasting 3 to 4 weeks, sugar accumulation continued at a similar rate to the first phase, but the rate of increase of the other components was much reduced. In the third phase, lasting 3 to 4 weeks, all components showed an accelerated rate of increase; 89% of the total sugar content at maturity was stored during this period. Attention is drawn to the similarity in the development of the fig to that reported elsewhere for the peach, apart from dry matter accumulation, which, in the latter, does not occur at a reduced rate in the second phase. An explanation is offered for this difference in behaviour.

2308. CRANE, J. C., AND BASKAYA, M.
Differential ovary wall development in fruitlets of hormone-induced parthenocarpic *Calimyrna* fig syconia.
Proc. Amer. Soc. hort. Sci., 1950, 56: 83-5, bibl. 6, illus.

Histological studies in California on mature *Calimyrna* syconia showed that the endocarp of achenes in syconia produced with para-chlorophenoxyacetic acid had developed but had remained parenchymatous in character instead of becoming sclerified as in normal syconia. By contrast, in mature syconia produced with gamma-(indole-3)-n-butyric acid the endocarp in the individual achenes was entirely absent.

2309. HARTMANN, H. T.
Time of floral differentiation of the olive in California.
Bot. Gaz., 1951, 112: 323-7, bibl. 5, illus.

Experiments in 1946 and 1947 established that floral differentiation in the olive occurred in March, about 8 weeks before full bloom. Little or no variation was found among the 3 varieties studied or among the 5 localities from which samples were collected. The microscopic appearance of the bud did not change from the time of its formation in June until floral differentiation in the following March.—Univ. Calif.

2310. HARTMANN, H. T.
The effect of girdling on flower type, fruit set, and yields in the olive.
Proc. Amer. Soc. hort. Sci., 1950, 56: 217-26, bibl. 9.

Ring-barking vigorous olive trees of several varieties in California during December, January or February resulted in an increased percentage of perfect flowers, increased fruit set and increased yields, but did not prevent biennial bearing when done in the winter

months preceding the off-year. Circumference measurements of the primary scaffold branches on older trees showed no reduction in growth in the season following ringing, but where the operation was repeated on young trees in two successive years shoot growth was reduced, due probably to increased fruit production. No injurious effects from the ringing itself were noted. Covering the cuts first with hot grafting wax, then with bordeaux paste and finally with asphalt-emulsion grafting compound gave excellent control of *Bacterium savastanoi*, without the injury that was sometimes apparent when bordeaux paste was applied without the coating of grafting wax.

2311. ACKERMAN, W., AND HOUGH, L. F.
Determination and correlation of leaf and fruit pigments of yellow- and white-fleshed peaches.
Proc. Amer. Soc. hort. Sci., 1950, 56: 157-63, bibl. 10.

Methods are described whereby chromatographic adsorption and spectrophotometric analyses of leaf pigments of peach varieties and seedlings were evaluated for correlations with flesh colour of the fruit. Senescent yellow leaves collected just before they abscised from 562 yellow- and white-fleshed trees were separated readily, and with no inconsistencies, on the basis of the percentage reflectance at the single wavelength 510 mμ. —New Jersey agric. Exp. Stat.

2312. HESSE, C. O., AND GRIGGS, W. H.
The effect of gland type on the wettability and water retention of peach leaves.
Proc. Amer. Soc. hort. Sci., 1950, 56: 173-80, bibl. 6, illus.

Peach leaves of different varieties possess either reniform or globose glands or are eglandular (possessing no glands). In tests at Davis, California, the leaves of 5 varieties in each of these 3 foliage groups were sprayed with water and with water containing a detergent, and the water retention was determined. Immediately after wetting the reniform varieties retained water in average amounts of only 23.6% of their original weight; the globose varieties, of 42.1%; and the eglandular varieties, of 70.2%. Similarly the glanded leaves, particularly the reniform, dried more rapidly than the eglandular leaves. The results of surface-tension measurements and observations on the types of water film on the leaves suggest that a surface-tension phenomenon is probably responsible for the differences in wetting of glandular and eglandular foliage. The possible relationship between "wettability" and differences in susceptibility to attacks by fungi and insects was not determined directly.

2313. MORETTI, A.
Contributo alla conoscenza del metabolismo dell'azoto e degli idrati di carbonio del susino. (The metabolism of nitrogen compounds and of carbohydrates in plums.) [English and French summaries 9 lines each.]
Riv. Fruttic., 1951, 13: 1-26, bibl. 25.

The results are given of observations on the metabolism of nitrogen compounds and of carbohydrates in Santa Rosa plums, some with normal flowering, others showing autumn pre-flowering. With normal flowering

the accumulation of nitrogen and carbohydrates in the branches and their parallel movement to the growing points are noted. With autumn flowering nitrogen and carbohydrate metabolism was impaired and depressed. Autumn flowering was not correlated with the application of nitrogen fertilizers.

Propagation.

(See also 2268.)

2314. TRECCANI, C. P.

Prove di germinazione con semi quiescenti di fruttiferi. (**Germination test for dormant seeds of fruit trees.**) [English summary 3 lines.]

Ann. Sper. agrar., 1951, 5: 201-6, bibl. 6.

By using Flemion's "excised embryo" method (*H.A.*, 19: 40) the germination capacity of dormant seeds of peach, plum, acid cherry, apple and pear was determined. The results corresponded to those of normal germination of after-ripened seeds.

2315. HATCHER, E. S. J., AND GARNER, R. J.

Aspects of rootstock propagation. II. The development of the concentrated dip method of treating hardwood cuttings with growth substances.

A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 116-21, bibl. 3.

In experiments to determine optimum concentrations of alcohol dip treatment with indole-3-butyric acid for rootstock varieties, it was found that with Myrobalan B plum the best concentration was 0.5 mg. per ml., sub-optimal and eventually damaging effects being obtained with dips exceeding 1 mg. per ml. With Crab C apple autumn cuttings responded without damage to a dip of 5 mg. per ml. but the full rooting response to growth substance was obtained at one-tenth this strength. The relative merits of solution and dip methods for applying growth substances are briefly discussed and preference for the latter is explained.

2316. SOUBIHE SOBRINHO, J., AND MONTENEGRO, H. W. S.

Ensaio da época de plantio de estacas de marmeleiro. (**A time of planting trial with quince cuttings.**) [English summary $\frac{1}{2}$ p.] *An. Esc. sup. Agric. "Luiz de Queiroz", Piracicaba*, 1949, 6: 167-78, bibl. 9 [received 1951].

In Brazil the main difficulty in the propagation of quince from cuttings is that the cuttings tend to come into leaf before the root system has developed. In an attempt to overcome this difficulty a trial was carried out to determine the optimum time for propagation. Cuttings of the variety Mato Dentro were taken at 6 dates during the dormant period, from 15 June to 30 August. The earliest cuttings were by far the most successful. A further trial is planned to determine whether even better results may be obtained by propagating in May or early June.

2317. GARNER, R. J.

The grafting of very young apple seedlings. *A.R. E. Malling Res. Stat. for 1950, 1951, A34*, pp. 71-5, bibl. 4, illus.

Seven methods of grafting apples in the cotyledon and early seedling stage on to mature trees, clonal rootstocks and young seedlings are described. The union of scions in the cotyledon stage with one-year clonal rootstocks was obtained without difficulty.

2318. VAN CAUWENBERGHE, E.

Le greffage des arbres fruitiers en haute-tige. (**Regrafting standard fruit trees.**)

Fruit belge, 1950, 18: 132-9, 147-55, illus.

The conditions necessary for success in top-grafting standard fruit trees and methods used, including framework grafting, are described. A list is appended of numerous pear varieties grafted on quince, grown as vertical cordons, and regrafted at 1.25 m. when 30 years old with Doyenné du Comice, the vigour of the trees and the union formed being indicated in each case.

2319. THOMPSON, L. A., AND HESSE, C. O.

Some factors which may affect the choice of grafting compounds for top-working fruit trees.

Proc. Amer. Soc. hort. Sci., 1950, 56: 213-16, bibl. 4.

In a uniform block of 9-year-old Lovell peaches in California that were top-worked to Derby apricot on 4 dates in January-February, 1948, 2 cold asphalt emulsions gave significantly better results than 2 hot waxes, and the later grafting was much more successful than the earlier. The scions in the first 3 graftings were taken from prunings heeled-in in soil in the shade with the top two-thirds exposed; those in the last grafting were buried in moist sand for over a week before they were used. It is suggested that the poor results obtained in the earlier graftings were due to drying of both scions and stocks during the unusually dry winter of 1947-48. Similarly the unexpected success of the cold graft dressing may possibly have been due to moisture supplied to the tissues by the asphalt emulsions, whereas the hot waxes did not supply any moisture.

2320. RODNEY, D. R., AND BLEDSOE, R. W.

The survival of apple seedlings in 1948 as affected by grade, planting distance and treatments applied to tops and roots at planting time.

Proc. Amer. Soc. hort. Sci., 1950, 56: 210-12, being *J. Pap. N. Y. St. agric. Exp. Stat.* 803.

When over 8,000 apple seedlings, representing 6 different populations, were planted in a heavy wet soil in 1947, the percentage survival, after 2 growing seasons in the field, was found to be affected by the following factors: 1. Trees larger than $\frac{1}{2}$ in. in diameter showed a much higher percentage survival than smaller trees. 2. The planting distance between trees and waxing the tops of trees had no effect. 3. For trees $\frac{1}{2}$ in. to $\frac{3}{4}$ in. in diameter, the percentage survival was increased significantly and nearly equally by puddling the roots in mud, by dipping them in a starter solution or by using a combination of the two, whereas larger trees were not benefited by these treatments.

Rootstocks.

(See also 2403, 3118, 3135.)

2321. HOBLYN, T. N.

Research on fruit tree rootstocks.

Brit. agric. Bull., 1950, 3: 103-11, bibl. 18, illus., reprinted in *A.R. E. Malling Res. Stat. for 1950, 1951, A34*, pp. 193-200.

This is a broad review of research at East Malling on rootstocks for apples, pears, plums and cherries over the past thirty-eight years, indicating the lines along which there is likely to be progress in the future.

2322. SAX, K.

The effect of the rootstock on the growth of seedling trees and shrubs.

Proc. Amer. Soc. hort. Sci., 1950, 56: 166-8, bibl. 1.

Cases are described in which the progeny of species hybrids and occasionally of pure species may fail to grow satisfactorily on their own roots, but may grow well when grafted on suitable rootstocks. Examples of such failure are the F_1 hybrids of the lilacs *Syringa laciniata* and *S. vulgaris*, more than half of which died in their second year, seedlings of the apple species *Malus florentina*, and seedlings of the generic hybrid *Sorboypyrus auricularis*. A trial is described in which 30 seedling apples, from a cross between two F_1 species hybrids, were budded on apomictic *Malus toringoides* rootstocks, and were compared over two seasons with the original seedlings growing alongside them. The seedlings on their own roots grew slightly larger than their budded progeny and they were also rather more variable. In general, there was little correlation between the size of the seedling and the size of the corresponding budded tree. Some of the smallest seedlings remained small when budded, but one of the smallest seedlings produced the largest budded tree. The results of this and other trials with lilacs and apples suggest that poor seedling growth caused by poor root development may be corrected by providing the proper root system.—Arnold Arbor., Harvard.

2323. PICKETT, W. F.

Stionic effects on the internal structure of apple leaves.

Proc. Amer. Soc. hort. Sci., 1950, 56: 164-5, bibl. 1, being *Contr. Dep. Hort. Kans. agric. Exp. Stat.* 228.

The leaves of Winesap and Jonathan apples raised on several different rootstocks each fell into 3 groups on a basis of the calculated internally exposed leaf surface, and differences between the groups were significant in each case. With Jonathan these results, taken in conjunction with others, indicate that the foliage of trees on Malling XVI or Malling IX would be significantly more active in photosynthesis per unit of leaf area than the foliage of trees on Virginia Crab stock. No estimate of the total leaf area per tree was made.

2324. PRESTON, A. P., MOORE, M. H., AND BENNETT, M.

The influence of rootstock on spray damage in apple.

A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 132-6, bibl. 7.

1. Dwarf-pyramid, winter-pruned trees of Cox's Orange Pippin, 8 years old, on a series of new root-

stocks and of standard Malling rootstocks were sprayed with 1½% lime-sulphur at fruitlet stage for two consecutive seasons, and leaf-scorch was recorded before and after spraying; also leaf- and fruit-drop after spraying. 2. Significant differences among rootstocks within vigour groups were shown for leaf-scorch and leaf- and fruit-drop. In general, trees on dwarfing stocks were less damaged than those on vigorous ones, but there were exceptions. 3. The results are discussed in relation to a possible reduction of lime-sulphur damage through the genetical constitution of the rootstock. [Authors' summary.]

2325. MANARESI, A.

Osservazioni sui soggetti usati per l'innesto degli alberi da frutto nell'Emilia e nella Romagna. I. L'albicocco. (Observations on rootstocks used for grafting fruit trees in Emilia and Romagna. I. Apricot.) [French and English summaries ½ p.]

Riv. Fruttic., 1950, 12: 169-82, bibl. 10.

Observations during the last 25 years are recorded on the rootstocks used for apricots in Emilia and Romagna. *Prunus myrobalana* is generally used: the apricot grows well on it, but the scion stem remains relatively slender and there is a large union overgrowth. Apricot seedlings are not commonly used though they grow well in the nursery. *Prunus domestica* is used only on the wettest soils. *P. persica* and *P. insititia* are seldom used; they give good plants but with swollen unions. *P. spinosa* is suitable for poor soils; *P. davidiana* and *P. marianna* are seldom used but give good results. With *P. salicina* results are uncertain. On the almond stock the union is poor and the scion is easily broken. Budding is seldom used although the results obtained are fairly good.

2326. VAN CAUWENBERGHE, E.

Étude du système racinaire de quelques sujets porte-greffes de pruniers, identifiés à la Station expérimentale d'East-Malling. (A study of the root system of plum rootstocks identified at the East Malling Research Station.)

Fruit belge, 1950, 18: 177-84; 1951, 19: 29-32, 46-8, 85-8, illus.

This is an account of observations on the root systems of a number of East Malling selections of plum rootstock varieties grafted with the varieties Reine-Claude d'Oullins and Reine-Claude d'Althann. The trees had been planted in twos so that it was possible to take up one tree of each pair and examine its roots when 11 years old just as the trees were becoming too crowded. Notes are given on primary, secondary, tertiary and small roots, the union and callus of the graft, and suckering. Tables are appended showing the characters (size, weight) of the root system and of the scion stem and head.

Pollination.

2327. THOMPSON, A. H., AND BATJER, L. P.

The effect of boron in the germinating medium on pollen germination and pollen tube growth for several deciduous tree fruits.

Proc. Amer. Soc. hort. Sci., 1950, 56: 227-30, bibl. 8.

The addition of boron at 10 p.p.m. to a sucrose germination medium in every case markedly increased the percentage germination and pollen tube length in pollen of apple, apricot, cherry, peach, pear and plum, although the pollen came from trees that showed no symptoms of B deficiency. There were no differences in response related to the fertility characteristics of different varieties. In another trial with apple, pear and cherry, marked stimulation was obtained with B concentrations ranging from 2.5 to 160 p.p.m., but with 640 p.p.m. germination was much reduced. It is suggested that the increased fruit set reported earlier for Anjou pears following boron sprays [see H.A., 19: 2785] may have been due to the stimulating effect on pollen germination and pollen tube growth.—U.S. Dep. Agric., Wenatchee, Wash. St.

2328. BALDINI, E.
Contributo allo studio dell'impollinazione del ciliegio. (Pollination of cherries.) [English summary 8 lines.] *Riv. Ortofruttic. ital.*, 1950, 34: 200-8, bibl. 22, illus.

Results of self- and cross-pollination studies with 16 sweet cherry varieties are given. In the variety Marasca di Piemonte the pollen almost entirely failed to germinate; the pollen of all the other varieties tested proved to be perfectly normal and viable. Experiments at Florence since 1949 show that all varieties are self-incompatible, and that cross-incompatibility is also common.

2329. JOLEY, L. E., AND HESSE, C. O.
Effect of methyl bromide fumigation on flower opening and pollen viability of nectarine. *Proc. Amer. Soc. hort. Sci.*, 1950, 56: 231-3, bibl. 1.

Tests in California are described which show that fumigation with methyl bromide under vacuum at the rate of 3 lb. per 1,000 cu. ft. for 3 hrs. at 70° F. resulted in serious retardation of blossom opening in cut flowering branches of the nectarine P.I.159983. Fumigation had no adverse effect on dry pollen, but seriously impaired the fresher pollen in flowers fumigated immediately after cutting.

Soil management.

(See also 3135.)

2330. BAKŠI, A. JA.
Deep cultivation of the soil in orchards by plantation ploughing. [Russian.] *Sad i Ogorod*, 1951, No. 2, pp. 20-2, illus.

Deep ploughing with a tractor when applying manure in the zone of the main roots in orchards on heavy soils, even only in one direction, between the rows, restores good development of the above-ground parts of the trees and allows good recovery of roots (up to 3 cm. thick) severed by ploughing.

2331. GREENHAM, D. W. P.
Orchard soil management. *Worcester. agric. Chron.*, 1951, 19: 123-39.

The necessity for, and functions of, soil management are briefly outlined and 3 trials on cover cropping in apple orchards, begun at East Malling in 1940, are

described. As a result it is recommended that summer cultivation combined with organic manures or mulches or a cover crop of oats and tares be used until the trees are 5 years old, and that after this the orchard be grassed down. The seed mixture should not contain cocksfoot, but S23 perennial ryegrass with Kent wild white clover proved satisfactory. The sward should be mown frequently and dressed with the equivalent of 2 cwt. per acre of sulphate of ammonia in addition to the orchard dressing. A marked improvement in soil conditions was found under this management, with a noticeable increase in the market value of fruit.

2332. WEEKS, W. D., SMITH, C. T., AND DRAKE, M.
Residual effects of heavy mulching in a bearing apple orchard on soil nutrients. *Proc. Amer. Soc. hort. Sci.*, 1950, 56: 1-4, bibl. 6, being *Contr. Mass. agric. Exp. Stat.* 755.

In 1922 at the Massachusetts Experiment Station a mulch versus clean cultivation trial was established in an apple orchard growing in a loam soil. After 1939 the differential treatments were discontinued and the whole orchard was established in sod. In 1948 the residual effect of the mulch on total N, available P and exchangeable K, Ca and Mg was determined. Although the mulched plots had received no fertilizers either before or after grassing down, all values for soil nutrients were much higher than in the cultivated plots. The data clearly demonstrate the ability of a heavy mulch to supply and maintain a larger reserve of available nutrients than cultivation and sod.

Nutrition.

(See also 2375a, c, q.)

2333. FRITZSCHE, R.
Die Düngung der Obstbäume. (The manuring of fruit trees.) *Schweiz. Z. Obst- u. Weinb.*, 1951, 60: 89-96, illus.

Two methods of applying a complete fertilizer to fruit trees grown in sod in Switzerland are described. In the first a handful of a mixture of 1 part superphosphate, 3 parts ammonium nitrate and 2 parts potash is dropped into spade cuts at the rate of 2 cuts to 1 sq. m. of soil. In the second the same or a similar mixture is applied in the form of a 10% solution to the spade cuts or preferably with a fertilizer lance.

2334. BUTIJN, J.
Magnesium- en kaliumgebrek in de fruitteelt. (Magnesium and potassium deficiency on fruit farms.) [English summary ¼ p.] *Meded. Dir. Tuinb.*, 1950, 13: 813-16.

The Mg: K ratio in the soil, as determined in extracts prepared according to Morgan's method, affects the occurrence of Mg and K deficiency in apple and pear trees, wide ratios causing K deficiency and narrow ratios Mg deficiency.

2335. WORSWICK, G. D.
Tree symptoms and leaf analysis determine potash needs. *Bett. Crops*, 1950, 34: 9: 19-22, 41-3.

It is pointed out that fruit removed from the orchard may contain more potassium than nitrogen, whereas

leaves and wood, which return to the soil, contain more nitrogen than potassium. The loss of potassium from the soil often, therefore, becomes serious in fruit orchards. Leaf and shoot symptoms indicating potash deficiency in fruit trees are described and special mention is made of deficiency symptoms in Agen prunes, French prunes, apricots and pears. If leaf analysis indicates potash deficiency, it is recommended that large amounts of sulphate of potash (25-30 lb. per tree) be applied to small test plots to confirm this indication. Quick responses have been obtained from such large applications, and they have been found to last at least 5 years. In leaf analysis 100 leaves of the deciduous fruits supply sufficient material.

C.W.S.H.

2236. STANBERRY, C. O., AND CLORE, W. J.
The effect of nitrogen and phosphorus fertilizers on the composition and keeping qualities of Bing cherries.
Proc. Amer. Soc. hort. Sci., 1950, **56**: 40-5, bibl. 8.

Annual applications of N and P fertilizers, alone and in combination, were made during 6 years to a 14-year-old cherry orchard carrying alfalfa cover crops at the Washington Irrigation Experiment Station, near Prosser. The N applications increased the nitrogen content of leaves and fruit, and similarly the P applications increased their phosphorus content. As the N content increased, maturity tended to be delayed, but an increased P content had no effect on maturity or keeping quality. Injury to fruit buds or fruit by low temperatures had more effect on yields than the fertilizers applied.

2237. MORETTI, A.
Indagini sulle concimazioni azotate al pesco.
(An investigation on forms of nitrogen fertilizers used for peaches.) [French and English summaries $\frac{1}{2}$ p. each.]
Riv. Fruttic., 1950, **12**: 197-225, bibl. 103.

Observations are recorded on the influence of forms of N on the vigour of the plant, flowering, fruit setting, fruit drop, production, time of maturity, weight, colour and flavour of the fruits, and resistance of the plant to diseases and pests. It is concluded that sulphate of ammonia and, to a lesser degree, cyanamide, are the best forms of N for peach trees.

Composition.

(See also 2257.)

2238. HULME, A. C.
The amino-acids present in the protein of the apple fruit.
J. Sci. Food Agric., 1951, **2**: 160-6, bibl. 8, illus.

Two protein-containing fractions are obtained from an alkaline phosphate extract of the pulp of young Bramley's Seedling apple fruits and their amino-acid constitution determined, after hydrolysis, by means of filter-paper chromatography. It is shown that the two protein fractions contain the same twelve amino-acids but that aspartic acid is absent from one of the fractions. This fraction does, however, contain an additional acid which has not been identified but which appears, from its position on a two-dimensional chromatogram, to be

a basic acid. [Author's synopsis.]—D.S.I.R., Ditton Lab.

2239. ZUBRISKI, J. C., AND SWINGLE, C. F.
Potassium content of Montmorency cherry leaves in relation to curl-leaf and to exchangeable soil potassium.
Proc. Amer. Soc. hort. Sci., 1950, **56**: 34-9, bibl. 10.

Investigations in north-eastern Wisconsin showed that in sour cherry orchards suffering from curl-leaf the K content of leaves and amount of exchangeable K in the soil were below 0.75% and 200 lb. per acre respectively. A straight line relationship may be assumed between the K content of cherry leaves and the logarithm of exchangeable K in the soil, two seasons' data providing a highly significant correlation coefficient of 0.936. The application of mulch assisted in the correction of curl-leaf.

2240. POLLARD, A., AND KIESER, M. E.
The pectase activity of apples.
J. Sci. Food Agric., 1951, **2**: 30-6, bibl. 15.

A study has been made of the pectin-demethylating enzyme system in apple tissue and the level of activity compared with that in some other fruits. The apple varieties tested show considerable differences in their pectase content. The enzyme shows a maximum activity at pH 6.6: over the pH range of the fruit the activity is much lower, but the enzyme can still produce appreciable effects. Methods for the extraction and concentration of the enzyme are described. The concentrated enzyme preparations are readily inactivated by normal pasteurizing temperatures (68-70° C.), but in juices the enzyme shows a much greater stability. The significance of these findings is discussed in relation to the production of apple juice and pectin. [Authors' synopsis.]—Long Ashton Res. Stat.

2241. SZEMBER, A.
Mikroflora drożdżowa owoców krajowych.
(Fruit yeasts in Poland.) [Polish. English and Russian summaries $\frac{1}{2}$ p. each.]
Ann. Univ. Mariae Curie-Skłodowska, Sect. E, 1950, **5**: 221-38, bibl. 6, illus.

Samples of both soft and tree fruits and raisins were examined for their yeast flora, of which 54 strains were isolated and studied. Most frequent were *Saccharomyces apiculatus* and species of *Torula* and *Rhodotorula*. The most active occurred on plum, black currant and raisin.

Spraying to thin or retain fruit.

2242. BULLOCK, R. M.
Hormone research at the tree fruit experiment station.
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 119-22.

At Wenatchee the following observations have been made during work with hormones: *Fruit set*: No influence was noted on Bartlett pears, but on Anjou spraying in the cluster bud stage with NAA at 10 p.p.m. and 100 p.p.m. gave a 50% and 100% increase in set, respectively. NAA applied at full bloom had a blossom thinning effect. *Cork spot and hard end of pears*: Hormone sprays during the growing season had a varied effect, usually unfavourable. *Cherry cracking*:

In Bing cherries, NAA applied at 1 p.p.m., 10 days after shuck fall or 30 days before harvest, reduced cracking by 60%, the beneficial effect being most pronounced on trees carrying heavy crops. *Fruit colouring and maturity*: Of the materials used 2,4,5-T has given the most promising response in increasing colour on apples; effects on fruit maturity have been variable. *Control of winter injury* through regulating the internal water system of the plants with hormone applications is being attempted.

2343. MODLIBOWSKA, I.

The effect of certain growth-promoting substances upon frost-damaged apple flowers.

A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 65-70, bibl. 7.

The effects were examined of 26 organic acids on self-pollinated Cox's Orange Pippin and self- and cross-pollinated Ellison's Orange flowers frozen at various stages of development. Flowers with frost-damaged styles, whether treated or not, usually did not swell and none produced mature fruit. A single application of certain substances delayed abscission while that of others also stimulated the initial fruitlet development of self-pollinated Cox's Orange Pippin. In Ellison's Orange no untreated self-pollinated flowers set fruit, while the full development of treated flowers into mature fruits was always associated with the presence of seeds. In cross-pollinated Ellison's Orange there was some indication that a combination of certain growth substances was rather more effective than either applied alone.

2344. CRANE, J. C., AND BLONDEAU, R.

Hormone-induced parthenocarp in the Calimyrna fig and a comparison of parthenocarpic and caprifiged syconia.

Plant Physiol., 1951, 26: 136-45, bibl. 8, illus.

In an earlier investigation [see *H.A.*, 20: 1331] para-chlorophenoxyacetic acid (PCPA) was found to offer considerable promise as a material to induce parthenocarp, and thereby eliminate the problems of caprification in the Calimyrna fig industry. The largest percentage of figs set was obtained with an aqueous spray containing 60 p.p.m. of the compound. The present investigations were made to determine the range of concentration effective in inducing parthenocarp and the thoroughness with which the spray should be applied. It was found that with a progressive increase in concentration up to 80 p.p.m. there was a progressive increase in the percentage of fruit set parthenocarpically, 17% more being set at the 80 p.p.m. concentration than on the caprifiged controls. Concentrations above 80 p.p.m. had a depressing effect on percentage set. The wide range of concentration effective in promoting fruit set without injury to syconia, leaves or shoots emphasizes the great commercial possibilities of this material. A detailed comparison is made of the quality and characters of caprifiged Calimyrna figs and parthenocarpic figs produced with 60 p.p.m. PCPA. The material was found to be much more effective in producing parthenocarp when applied to the leaves than when applied to the young syconia. Para-fluorophenoxyacetic acid proved to be equally effective and harmless to the plant. With 2,4,5-T, either alone or in combination with

PCPA, it was not possible to obtain accelerated fruit maturation without causing damage to the foliage.—*Univ. Calif., Davis, and Shell Oil Co., Modesto, Calif.*

2345. CRANE, J. C.

Figs, wasps and hormones.

Amer. Fruit Gr., 1951, 71: 4: 11, 30-4, illus.

The use of plant growth regulators to set Calimyrna figs in California orchards is described. Para-chlorophenoxyacetic acid spray applied commercially in 1950 gave a 13% increase in marketable fruit due to the elimination of the internal rot disease carried by the pollinating wasp, and of fruit splitting. 2,4,5-T spray produced mature figs 15 days after application but caused injury to the trees. [See also *H.A.*, 20: 1330 and 1331.]

2346. SOUTHWICK, F. W., AND WEEKS, W. D.

Some attempts to thin apples with naphthaleneacetic acid type materials after calyx.

Proc. Amer. Soc. hort. Sci., 1950, 56: 70-5, bibl. 3, being *Contr. Mass. agric. Exp. Stat.* 754.

Data are presented on the influence of calyx and post-calyx thinning sprays of sodium NAA on the flowering of apples in the succeeding year, and on the effect of post-calyx sprays on fruit set, size and yield in the same year. Post-calyx sprays of NaNAA applied at 15 to 50 p.p.m. in 1948 increased blossoming of McIntosh and Golden Delicious in 1949, but Early McIntosh failed to flower. Applications at the calyx stage had less effect on flowering the next year. In 1949 NaNAA applied at 20 to 40 p.p.m. 2 weeks after the calyx stage decreased the number of fruit set and increased their size with some varieties but not others. NaNAA applied at 40 p.p.m. after the June drop had no effect on the number of fruits a month later.

2347. STRUCKMEYER, B. E., AND ROBERTS, R. H.

A possible explanation of how naphthalene acetic acid thins apples.

Proc. Amer. Soc. hort. Sci., 1950, 56: 76-8, bibl. 11.

In trials in Wisconsin App-L-Set (sodium NAA) at $\frac{1}{4}$ lb. per 100 gal. was applied to several varieties of apple within a week of petal fall. The treatment resulted in each case in an increased set of fruit on 29 May (23 days after full blossom) after the so-called first "June" drop, but in a decreased set on 15 July after the third "June" drop. In another test, using 2 varieties, blossoms were thinned by hand to 2 and 5 per spur and were hand pollinated. Applying NAA in this case increased the percentage set of the 5-blossom spurs from 41 to 61%, but had no appreciable effect on the 2-blossom spurs. It is concluded that the reduction in the number of fruits after the June drop was over, following spraying with NAA after petal fall, was due to nutritional competition and not to a direct thinning effect of the hormone.

2348. VRIJHOF, B.

Chemische bloemduinning op enige appelrassen in Zeeland. (Experiments on chemical thinning of blossom of apple varieties in the province of Zeeland.) [English summary 11 lines.]

Meded. Dir. Tuinb., 1950, 13: 299-305, bibl. 4.

In thinning trials using sodium DNOC on Jacques Lebel the best results were obtained by applying a concentration of 0.078% acid equivalent, and on Pomme de Coeur, Brabant Bellefleur and Zoete Ermgaard with 0.042 and 0.060% acid equivalents.

2349. RICH, A. C.

Our experience with chemical thinning.

Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 182-5.

The apple varieties Winesap, Jonathan, Newtown and Yellow Transparent growing in a commercial orchard in Yakima, Wash., were thinned with the following materials: Elgetol or Krenite at 1½ pt. per 100 gal., Di-Nitro Dry at ¾ lb. per 100 gal., and naphthaleneacetic acid (on Jonathans only) at 2 pt. per 100 gal. of water. The chemical spraying was followed by an early hand thinning and the results were very satisfactory.

2350. HIBBARD, A. D., AND MURNEEK, A. E.

Thinning peaches with hormone sprays.

Proc. Amer. Soc. hort. Sci., 1950, **56**: 65-9, bibl. 8, being *Contr. J. Ser., Dep. Hort., Miss. agric. Exp. Stat.* **1200**.

In 1948 and 1949 naphthaleneacetic acid at 40 to 60 p.p.m. applied 35 days after full bloom gave satisfactory thinning of Elberta peach fruits. In other trials NAA applied earlier than this and in weaker concentrations had little or no effect. Elgetol 20 applied at full bloom gave erratic results.

2351. VYVYAN, M. C., AND TROWELL, G. F.

Use of sprays to control fruit drop. VII. Effect of season and date of spraying on control of June drop in Cox's Orange Pippin.

A.R. E. Mallng Res. Stat. for 1950, 1951, **A34**, pp. 111-15, bibl. 5.

Further evidence [see *H.A.*, 17: 1983 and 18: 2476] was obtained for seasonal variation in the intensity of June drop and in the effectiveness of NAA for controlling it. In 1949 the date of applying NAA was found to be important. The crop was increased by NAA sprays applied on 2 June. Applications on 20 June and 18 July had little effect, while those on 11 May were harmful and reduced the crop. Successive applications made on all 4 dates increased the crop, but less than a single spray applied on 2 June alone. Better results were obtained by adding NAA to dispersible sulphur, parathion and lead arsenate sprays than from applying it alone. In view of seasonal differences in response to NAA sprays applied in late June, an additional application in a routine protective spray at the beginning of June is suggested.

2352. BARLOW, H. W. B.

Use of sprays to control fruit drop. VI. Rain and the control of pre-harvest drop in Sunset apples.

A.R. E. Mallng Res. Stat. for 1950, 1951, **A34**, pp. 108-10, bibl. 4.

Sprays of α -naphthaleneacetic acid (NAA) at 10 p.p.m. and α -(2,4,5-trichlorophenoxy)propionic acid (TCPPA) at 5 p.p.m. applied to Sunset apples to control pre-harvest drop were followed within 2 hours by heavy rain. A second set of applications were not interfered

with by rain, and showed that NAA controlled pre-harvest drop in this variety, but that the effectiveness was reduced by the rain after the first application. TCPPA was not effective even when applied twice.

2353. RIERA, F. J.

La caída prematura de manzanas y peras. Aplicación de sustancias reguladoras de carácter fitohormonal. (Pre-harvest drop of apples and pears. The application of growth-regulating substances.) [English summary ½ p.]

An. Esc. Perit. agric. Barcelona, 1949, **8**: 149-66, bibl. 27, illus.

Results obtained on early pears and late apples confirm the efficacy of salts of α -naphthaleneacetic acid at 10^{-4} and $5 \cdot 10^{-5}$ molar concentrations in reducing pre-harvest fruit drop, the solutions being applied 10 to 15 days before the expected picking time. The reduction in the premature fall was 13 to 32% for pears and 2 to 43% for apples.

2354. CARLONE, R.

Effetto di sostanze di accrescimento sulla caduta prematura dei frutti in alcune varietà di melo e di pero. (Primo contributo.) (Effect of growth substances on the pre-harvest drop of apples and pears. (First contribution.)) [English summary ½ p.]

Ann. Sper. agrar., 1951, **5**: 55-93, bibl. 54.

Experiments carried out in 1948 and 1949 using α -naphthaleneacetic acid and two proprietary products are described. It was found that two applications are much more effective than one, that the best concentration for α -naphthaleneacetic acid is 10 p.p.m. and that removal of the acid within 2 hours of application nullifies its effect.

2355. CARLONE, R.

Effetto di trattamenti con l'acido 2,4 di clorofenossiacetico e di altre sostanze di accrescimento sulla cascola pre-raccolta di varietà di melo e pero. (The effect of 2,4-D and other substances on pre-harvest drop of apple and pear varieties.) [English summary 6 lines.]

Riv. Ortoflorofruttic. ital., 1951, **35**: 57-65, bibl. 10.

Against pre-harvest drop 2,4-D was particularly effective on the variety Stayman Winesap; with other apple varieties such as Renetta Champagne and Renetta Walder it was less efficient than α -naphthaleneacetic acid and Fruitone. With two pear varieties, Curato [Vicar of Winkfield] and Cedrata Romana, the three substances were equally efficient. No phytotoxic effects were observed on the trees treated with 2,4-D.

2356. FRENCH, B. O.

Tests with hormone sprays for control of pre-harvest drop in Pullars' Cling peaches.

Agric. Gaz. N.S.W., 1950, **61**: 461-2, bibl. 1.

None of the proprietary hormone-type sprays containing α -naphthaleneacetic acid used in the experiments recorded was proved conclusively to have promoted fruit retention.

2357. ROBERTS, A. N., AND HANSEN, E.
Effects of 2,4,5-T sprays on color development and ripening of apples, peaches and pears.
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 191-3.

From results of experiments carried out in Oregon it is apparent that 2,4,5-T sprays applied to apples, peaches and pears do not increase the amount of red colouring of these fruits. However, such sprays do accelerate their maturation in varying degrees, depending on type and variety of fruit and concentration and time of application.

2358. BATJER, L. P.
Research with growth-regulating chemicals on fruits.
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 187-9.

At the Wenatchee laboratory of the U.S. Department of Agriculture, NAA and 2,4-D were used for prevention of fruit drop on apples and pears, and a new chemical, 2,4,5-T-P (2,4,5-trichlorophenoxypropionic acid), has been tested for apples and found promising. NAA has proved most effective for thinning apples. Results with 2,4,5-T on apples and peaches have been disappointing. When sprays containing 50 to 100 p.p.m. of 2,4,5-T-P were applied to Bartlett pears at the pink bud stage a phenomenal increase in set was obtained, but the treatment adversely affected the shape of fruit and caused a curious type of breakdown. By contrast, on Anjou pears and several apple varieties 2,4,5-T-P caused almost complete fruit shedding.

2359. MATVEEV, M. I.
Defoliating figs and pomegranates by using alpha-naphthaleneacetic acid. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1950, 72: 189-91, bibl. 12.

One-year-old shoots and trunks of fig and pomegranate were treated with paste and "cream" containing 1, 2 or 3% α -naphthaleneacetic acid applied in a ring round the treated parts. The leaves of the treated shoots turned yellow within a few days and dropped prematurely, the paste being more effective than the cream. On fig the 2% and on pomegranate the 1% NAA had the greatest effect. On fig the yellowing was confined to the shoots actually treated, on pomegranate it extended to neighbouring shoots. The stem treatment produced yellowing of the foliage on fig, but not on pomegranate.

Pruning.

(See also 2375j.)

2360. KARPOV, G. K.
Regular pruning as a method of obtaining high yields annually. [Russian.]
Sad i Ogorod, 1951, No. 3, pp. 24-32, illus.

Regular pruning of apples is practised in southern regions of the U.S.S.R., but in central and northern zones only thinning the crown and the removal of broken and dead branches are carried out. The advantages of regular pruning are discussed and data, showing increased yields of apple fruits and leaf size

due to pruning, are given from results obtained in the central region of the U.S.S.R.

2361. GOGIN, A. F.
Rejuvenation of the apricot. [Russian.]
Sad i Ogorod, 1951, No. 2, pp. 33-5.

Hard pruning is advocated for the rejuvenation of apricots. When carried out in winter the resulting growth on the hard-pruned trees was twice that on trees treated in spring and three times that on unpruned trees.

2362. PRESTON, A. P., AND BARLOW, H. W. B.
The use of growth substances to widen crotch angles.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 76-9, bibl. 2, illus.

Different concentrations of indole-3-butyric acid were applied to cut-back maiden and 2-year-old plum trees to encourage wide-angled crotches in the primary branch framework. The acid, applied as a lanolin emulsion containing 90 mg. per 100 g., showed an improvement of 23° for the first branch crotch angle over the control treatment without growth substance. Higher concentrations of growth substance depressed the growth of the first three primary branches. The results are discussed in relation to horticultural practice.

Harvesting, packing and marketing.

(See also 2200, 2276, 2277, 2375b, g, p.)

2363. DERMINE, E.
La détermination de la maturité des fruits.
(The determination of maturity in fruits.)
Fruit belge, 1951, 19: 50-3.

This article discusses briefly the resistance of the flesh to pressure, the refractive index and dry matter content of the juice, and the reaction of the flesh to potassium iodide.

2364. CARLSEN, E. W., AND STOKES, D. R.
Prepackaging apples at point of production.
Agric. Inf. Bull. U.S. Dep. Agric. 29, 1951, pp. 52, illus.

This study of the pre-packaging of apples, conducted in the Pacific Northwest States of America, revealed a number of ways of reducing the costs of pre-packaging, either through a reduction in the cost of materials or through development of new techniques. A very efficient bagging chute and 5 different methods of pre-packaging were developed. Wooden boxes were not found satisfactory for shipping bags of apples, and a bonding-type one-piece slotted carton was designed for the purpose. The results of preliminary investigations on consumer and retailer acceptance of pre-packaged apples were favourable.

2365. DIVISION OF SPECIAL SURVEYS, U.S.D.A.
Consumer preferences regarding apples and winter pears.
Agric. Inf. Bull. U.S. Dep. Agric. 19, 1950, pp. 69, 25c.

The findings of a survey, covering all parts of the United States, are tabulated. The survey was designed to determine how apples, apple products and winter pears are used, and what factors influence consumer preferences.

Storage and fruit products.

(See also 2336, 2375d, r.)

2366. DEWEY, D. H.

The effects of air blast precooling on the moisture content of the stems of cherries and grapes.

Proc. Amer. Soc. hort. Sci., 1950, 56: 111-15, bibl. 3, being *Pap. Dep. Veg. Crops Cornell Univ.* 333.

The freshness of cherries and grapes is often judged by the condition of the stems. Schmidt sweet cherries, Montmorency sour cherries and Concord grapes in 1 qt. wooden containers were precooled to 1-2° C. In portable air tunnels providing a blast of about 770 ft. per min., precooling was completed in 30 to 50 min. compared with more than 7 hrs. taken in still air. Reductions in the moisture content of the cherry stems were smaller in the air blast than in still air, and this advantage was retained when the fruit was transferred to still air when precooling had been completed. There were no significant differences in the moisture contents of the grape stems precooled by the two methods.

2367. VERHAERT, A.

Entreposage frigorifique des fruits. (Cold storage of fruits.)

Fruit belge, 1951, 19: 64-9, bibl. 4.

The factors to be considered in the cold storage of fruits are discussed, particularly in relation to temperature, relative humidity, renewal of the air, accidents (desiccation, freezing, brown-heart, excess moisture, too rapid ripening, scald) and their avoidance, optimum conditions and the duration of storage, with a note on storage at temperatures below 0° C.

2368. TRECCANI, C. P.

Stato attuale delle ricerche sulla conservazione in frigorifero delle mele e delle pere. (Recent work on the cold-storage of apples and pears.)

Riv. Fruttic., 1951, 13: 104-34, bibl. 91, illus.

Recent work on the cold storage of apples and pears and on methods of determining their maturity is reviewed. An analysis is made of cold storage methods in relation to the quality of pears and apples and of controlled gas-storage.

2369. VAN HIELE, T., AND VAN DE PLASSE, J. B.

Gasbewaring van Conference. (Gas-storage of Conference pears.) [English summary ½ p.]

Meded. Dir. Tuinb., 1950, 13: 398-404, bibl. 2, illus.

Experience in the gas-storage of Conference pears has been gained over 3 years. A mixture of 5% CO₂ and 15% O₂ or 7.5% CO₂ and 12.5% O₂ gave fair results. At 0 to 1° C. the fruits can be stored up to 15 February. When taken out of storage and kept at 18° C. they require 3-5 days to become fully ripe.

2370. HULME, A. C.

Apparatus for the measurement of gaseous conditions inside an apple fruit.

J. exp. Bot., 1951, 2: 65-85, bibl. 11, illus.

Skin-coating of apples with oil-water emulsions sometimes produces symptoms of physiological diseases like those produced by fruit stored in low oxygen concentrations. Two types of apparatus were designed, and are described, for analysing the internal atmosphere and measuring the CO₂ output, gas concentrations, atmospheric pressure and permeability of fruit to gases. Changes within skin-coated fruit are described: combined CO₂ and O₂ concentration falls, and it is believed that this will be valuable, if suitably controlled, in increasing the cold storage life of apples.—Ditton Lab., D.S.I.R. C.W.S.H.

2371. PORRITT, S. W.

The role of ethylene in fruit storage.

Sci. Agric., 1951, 31: 99-112, bibl. 86, being *Contr. Div. Hort. Exp. Fms Serv., Canada Dep. Agric.* 742.

A comprehensive review of the literature on the effects of ethylene in fruit storage and existing commercial practices involving its use, mainly for colouring citrus fruits.

2372. FIDLER, J. C.

A comparison of the aerobic and anaerobic respiration of apples.

J. exp. Bot., 1951, 2: 41-64, bibl. 24.

Oxygen has a conserving effect on the loss of carbohydrates, but does not affect the rate of loss of acid. The latter is proportional to the logarithm of its concentration and is constant for a given variety of apple. Production of CO₂ and alcohol, under both aerobic and anaerobic conditions, is quantitatively related to the loss of carbohydrates and acid. Under anaerobic conditions the nature and quantity of the end products of carbohydrate respiration are identical to those produced in the alcohol fermentation of yeast, and the CO₂ produced over and above this is equivalent to that which would be produced by oxidation of the acid.—Ditton Lab., D.S.I.R. C.W.S.H.

2373. CRUESS, W. V.

The dried-fruit industry and frozen-food production in California.

J. Sci. Food Agric., 1951, 2: 149-56, bibl. 18.

In a general account of the Californian industry production figures are tabulated and a concise account is given of methods used in processing and, in some cases, of the varieties grown for the purpose. The main fruits dried are apples, apricots, peaches, figs, prunes and grapes. Fruits and vegetables grown for freezing include apples, apricots, strawberries, oranges (as orange-concentrate), asparagus and peas.

2374. JACKSON, T. H., AND ROGER, B. E.

Pear drying.

E. Afr. agric. J., 1950, 16: 84-5.

In Kenya there is often a glut of Keiffer pears on the market. A method of preserving and drying is described. The process consisted first of sulphuring, i.e. placing the cut ripe fruit on trays over burning sulphur for 8-12 hrs., and secondly of drying for 18-40 hrs. (according to size of fruit) in a forced-draught pyrethrum drier. The process was successful and samples seven months old showed no deterioration. C.W.S.H.

Noted.

2375. a ANDERSON, J. C., AND OTHERS.
Fertilizer and lime recommendations for New Jersey.
Circ. N.J. agric. Exp. Stat. **539**, 1950, pp. 15.
Including fruits and vegetables.
- b ANON.
Apples picked about twice as fast from the ground as from ladders.
Science for the Farmer, March 1951, p. 4, illus., being *Suppl. 63rd A.R. Pa agric. Exp. Stat.* 1949/50, 2.
- c BARBIER, G., QUIDET, P., AND TROCMÉ, S.
Observations sur la carence en potasse du pommier et du groseiller. (Observations on potash deficiency in apples and currants.)
C.R. Acad. Agric. Fr., 1950, 36: 270-3.
- d BREKKE, J. E., AND TALBURT, W. F.
Preparation of fig powder.
(*Publ.*) *U.S. Dep. Agric. AIC-283*, 1950, pp. 7.
- e BREVIGLIERI, N.
Note su un viaggio di studio in Francia. (Notes on a study visit to France.)
Riv. Ortoflorofruttic. ital., 1950, 34: 146-66, illus.
An account of fruit-growing in various parts of France.
- f BUTIJN, J.
Bodembehandeling in de fruitteelt. (Soil treatment in fruit-farming.) [English summary 3 lines.]
Meded. Dir. Tuinb., 1950, 13: 745-51, bibl. 7.
- g VAN CAUWENBERGHE, E.
Principes de base à prendre en considération pour l'emballage de nos fruits. (Basic principles of fruit packing.)
Fruit belge, 1951, 19: 58-63, bibl. 3.
- h EGGERT, F. P.
Fruits for Maine.
Ext. Bull. Me agric. Exp. Stat. **403**, 1950, pp. 12.
Tree and soft fruit varieties are listed.
- i FOYTIK, J.
California plums; economic status, 1950.
Circ. Calif. agric. Exp. Stat. **398**, 1950, pp. 26.
- j MINISTRY OF AGRICULTURE, LONDON.
Pruning plums and cherries.
Adv. Leaflet. Minist. Agric. Lond. **124**, 1951, pp. 4, 1d.
- k NORBURY, C. P.
Present day trends in apple production.
Worcester. agric. Chron., 1951, 19: 97-111.
- l REBOUR, H.
Choix d'une méthode d'arrosage en culture fruitière. (Choice of a method of irrigating fruit trees.)
Pomol. franç., 1951, 78: 5-11, illus.
- m REBOUR, H.
Tracé et exécution du système d'irrigation. (Designing an irrigation system.)
Pomol. franç., 1951, 78: 21-7, illus.
- n REBOUR, H.
Pratique et contrôle des arrosages. (The practice and control of irrigation.)
Pomol. franç., 1951, 78: 42-50, illus.
- o ROSSI, F.
La frutticoltura in Umbria; stato attuale e possibilità di estendimento. (Fruit-growing in Umbria; its present state and the possibility of its extension.)
Ann. Fac. Agrar., Perugia, 1942, 1: 1-78, bibl. 21, illus. [received 1951].
- p SIAENS, M. F.
Triage et calibrage des fruits. (The grading and sizing of fruit.)
Fruit belge, 1951, 19: 54-7.
- q STANBERRY, C. O., AND CLORE, W. J.
How do nitrogen and phosphorus fertilizers affect the composition and keeping quality of Bing cherries?
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 26-7.
See abstract No. 2336.
- r ZWEEDE, A. K.
Actuele vraagstukken bij de bewaring en verwerking van tuinbouwproducten. (Present day problems in storing and processing horticultural products.)
Reprinted from *Verslag Studieweek Huis-houdwetenschap*, 22-26 May, 1950, Wageningen, pp. 79-98, bibl. 15.

SMALL FRUITS, VINES AND NUTS.

Small fruits.

(See also 2201, 2232, 2257, 2292, 2375h, 2565, 3131.)

2376. TER PELKWIJK, A. J.
Een studie over bramenrassen. (A study on varieties of blackberries.) [English summary $\frac{1}{2}$ p.]
Meded. Dir. Tuinb., 1950, 13: 774-88, bibl. 62, illus.
The classification, propagation and cytology of blackberries are reviewed and a survey given of:—the best known blackberry varieties selected from wild plants,

some artificial crosses of blackberries, thornless varieties on record and the best known hybrid berries.

2377. EATON, E. L.
Propagating highbush blueberries by mounding.
Sci. Agric., 1951, 31: 131-2, bibl. 4.
Kengrape and Pioneer highbush blueberries, normally difficult to root in solar frames, were found, at Kentville, N.S., to root freely where mounded with softwood sawdust or granulated peat. By this method smaller plants not suitable to supply ordinary cuttings can be

utilized with the advantage that very little after-care is needed.

2378. CHILDS, W. H.

Greenhouse fertilization of blueberry hybrids grown in shredded sphagnum.

Proc. Amer. Soc. hort. Sci., 1950, **56**: 23-6, bibl. 5, being *Sci. Pap. W. Va agric. Exp. Stat.* **419**.

A fertilizer trial was carried out from February to November 1949 on blueberry seedlings grown in sphagnum moss in a greenhouse at Morgantown, West Virginia. A nutrient solution, prepared by dissolving 1 lb. of 4-12-4 fertilizer in 8 gal. tap water, was applied twice a week, once a week, or once every two or three weeks at a rate of 1 gal. to 133 plants. The highest mortality and least growth was obtained among plants receiving fertilizer twice a week. Mortality was similar with the three other treatments, but the plants receiving fertilizer once a week made less linear growth than those receiving it at less frequent intervals. There was no practical difference between the growth made by plants receiving fertilizer once in 2 weeks or once in 3 weeks, and the latter is therefore recommended for use pending trials on still less frequent applications.

2379. WATT, J. H.

Gooseberry culture.

Bull. N.Z. Dep. Agric. **297**, revised 1948, pp. 16, illus. [received 1951].

An account is given of locations, soils, drainage, propagation, planting, pruning, manuring, harvesting and pest and disease control for gooseberries grown under New Zealand conditions. Brief descriptions are given of 8 varieties, among which Farmers Glory is said to be the best and most consistent cropper. A plan is given of a cheaply-constructed winnowing machine designed to remove leaves and twigs from the berries. The fruit is packed in 6 or 12 lb. wooden cases.

2380. CADMAN, C. H., AND WOOD, C. A.

Raspberries in Scotland.

Sci. Hort., 1950 (issued 1951), **10**: 124-33, bibl. 6, illus., reprinted in *A.R. E. Malling Res. Stat. for 1950, 1951*, **A34**, pp. 203-8.

This is a popular survey including descriptions of the raspberry varieties of commercial importance in Scotland, with notes on the freedom from diseases (particularly virus diseases) of available stocks of each variety.

2381. WILLIAMS, C. F.

Influence of parentage in species hybridization of raspberries.

Proc. Amer. Soc. hort. Sci., 1950, **56**: 149-56, bibl. 1, being *Pap. J. Ser. N.C. agric. Exp. Stat.* **366**.

Of about 40 introduced *Rubus* species, hybridization with American raspberries has been attempted with 17 and has been successful with 8. Data are presented on vigour, fruit diameter, drupelets per berry and resistance to leaf spot (*Septoria rubi*) of F_1 hybrids and back-crosses of the F_1 hybrids of American varieties with *R. coreanus*, *R. parvifolius*, *R. kuntzeanus* and especially *R. biflorus*. Some of the selections of these multiple species hybrids are very vigorous, productive and

disease resistant, and produce very large, firm, cohesive and attractive fruits. Types with satisfactory flavour have already been secured, but further improvement in this respect is still necessary.

2382. FLEMING, H. K.

1950 strawberry variety trials in Erie county, Pennsylvania.

Progr. Rep. Pa agric. Exp. Stat. **41**, 1951, pp. 4.

In a series of variety trials carried out on gravelly sandy loam at the Erie County Field Research Laboratory, Pennsylvania, the Temple variety gave outstandingly good results. It produced a full matted row of strong plants and was a high yielder of large berries of good flavour and handling quality over a long season. Fairland, Culver, Sparkle and Variety X also yielded well. Tables are given showing the harvest season, total yield and berry size of the varieties tested.

2383. HARRIS, G. H.

Sawdust as a mulch for strawberries.

Sci. Agric., 1951, **31**: 52-60, bibl. 17.

An experiment carried out at the University of British Columbia indicated that sawdust mulching was, on the whole, beneficial for strawberries. The physical condition of the soil was improved while the N content was reduced. The yield and vitamin C content of the fruit were increased, and the sugar content was decreased.

Vines.

(See also 2257, 2264, 2366, 2566.)

2384. ANON.

La viticulture dans le monde. (Viticulture throughout the world.)

Terre maroc., 1950, **24**: 414-19.

An account of the areas (in hectares) under vines in the various parts of the world, with notes on yields.

2385. BARANOVSKIĬ, A. L.

The special agrotechnique for viticulture in north-west Ukraine. [Russian.]

Doklady vsesojuz. Akad. Sel'sk. Nauk, 1951, **16**: 4: 25-30, bibl. 5, illus.

It is generally acknowledged that viticulture is not impossible in the Ukraine. Even the north-western regions need not be excluded if special precautions are taken. These include (a) the selection of varieties suitable for the area, (b) the application of special methods for protection against winter injury, (c) taking precautions against injury from autumn and winter frosts. These points are discussed in some detail particularly under (b) which illustrates deep planting, growing in trenches, and covering the vines in winter.

2386. DALMASSO, G.

Nei paesi dove si vendemmia anche d'inverno. (Districts where grapes are harvested even in winter.)

Humus, 1951, **7**: 2: 13-22, illus.

This is an account of grapes grown on the Riviera, particularly the district between San Remo and Nice, where varieties are grown which under those favourable climatic conditions mature very late in the year.

Varieties mentioned and illustrated are St. Jeannet, Gros Vert, and Servant.

2387. KRIMBAS, B. D.

Greek grape vine varieties. [Greek, French and English.]

Ampélographie hellénique 1949, Vol. 3, pp. 206, illus., published by Minist. Agric., Athens [received 1951].

Detailed descriptions, in Greek, French and English, are given of 42 varieties of grape growing in a collection at the College of Agriculture, Athens. The details given include time of bud break, general leaf characters and venation, the grape bunch and berry characters and information on sugars and total acidity of the must and uses of the variety. The author points out that the ratio length of berry to length of seed has proved one of the more stable characteristics for use in identification, and this ratio is given in each case. Factors involved in sampling and in obtaining representative measurements on which to calculate the ratio are discussed. Each description is accompanied by a photograph of a bunch and of a leaf.

2388. VIDAL, J. P.

Les hybrides producteurs-directs. (Direct-producer hybrids.)

Terre maroc., 1950, 24: 284-7.

The qualities sought in a perfect direct-producer vine hybrid are set out, and the progress made in the search for such hybrids for cultivation in Morocco is outlined. At the School of Agriculture 130 hybrids are being studied.

2389. CHEVALIER, A.

Ampélidées nouvelles d'Afrique occidentale.

(New ampelidaceous species of West Africa.)

Rev. int. Bot. appl., 1950, 30: 449-60.

Species of *Cissus* and of *Ampelocissus* are enumerated and briefly described. The author considers that these native species are unsuitable for use in breeding work designed to raise varieties of table grapes for growing in the tropics.

2390. SCOTT, D. H., AND INK, D. P.

Grape seed germination experiments.

Proc. Amer. Soc. hort. Sci., 1950, 56: 134-9, bibl. 6.

Seed from open-pollinated fruit of several grape varieties was used in trials at the Plant Industry Station, Beltsville, Md. All seeds were sown in a greenhouse with day temperatures of 75° to 85° F. and night temperatures of 60° to 65° F. Seeds sown direct from freshly harvested fruit showed very low germination and such plants as did grow were dwarfs. After-ripening by holding the seeds in a moist condition at 40° F. for 3 months was effective in increasing germination. Seeds of some varieties showed much lower germination than others, but the reason for this is obscure. The use of sulphuric acid in some trials was largely ineffective, and was harmful when seeds with a high moisture content were treated with concentrated acid for 15 min. Fermentation of the pulp containing the seeds for 3 days did not appear to depress germination. In a comparison of germination media there was little difference between sphagnum, sand, or a mixture of the two.

2391. BASTELEUS, R.

Les procédés de plantation des boutures utilisés dans les serres belges. (The methods of striking cuttings employed in Belgian greenhouses.)

Progr. agric. vitic., 1951, 135: 151-5, illus.

After an introduction on the necessity for selecting suitable material, the author discusses hardwood cuttings, ordinary cuttings, and budding.

2392. POURCHARESSE, P.

Étude expérimentale sur le bouturage et le greffage. (Experiments on cuttings and grafting.)

Progr. agric. vitic., 1951, 135: 221-3.

Viticultural notes on using growth substances on cuttings, grafting on plants raised from cuttings, rootgrafting, stratification, and the use of paraffin in grafting.

2393. RAČKOV, V. M.

Hastening the development of vine bushes after "katavlak". [Russian.]

Vinodelie i Vinogradarstvo, 1951, No. 3, pp. 29-32, illus.

"Katavlak" (layering branches from bushes sunk bodily in the ground) is advocated as a method of restoring vineyards having old bushes or blanks in the rows. Ways of training the plants so obtained are discussed and illustrated.

2394. TAVADZE, P. G.

The effect of growth substances on the proportion of high quality budded grapevines. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1950, 71: 953-5, bibl. 9.

It is stated that, from data discussed,* the best plants were obtained from rootstock cuttings treated, before budding, at their upper ends for 12 hrs. with 5 p.p.m. dichlorophenoxyacetic acid, the results being 47% first-class plants as against 18% for controls (water only), the next best results being obtained with 0.01% heteroauxin (28%). [The figures tabulated, however, show both these results for heteroauxin.]

2395. TRECCANI, C. P.

Paraffine a basso punto di fusione nell'attaccamento dell'innesto al tavolo della vite. (Paraffin waxes with low melting points used for grafting vines.) [English and French summaries 6 lines each.]

Riv. Fruttic., 1950, 12: 226-34, bibl. 3.

Paraffin waxes with melting points of 48°-50° C. and 50°-52° C. were applied, by dipping and painting, to whip-grafts of Barbera on 420 A. Neither proved satisfactory, results with the former being particularly bad.

2396. SNYDER, E., AND HARMON, F. N.

Growth comparisons of vinifera grape varieties after growing 44 years on Rupestris St. George rootstock.

Proc. Amer. Soc. hort. Sci., 1950, 56: 169-72, bibl. 2, illus.

Vinifera grape varieties grafted on Rupestris St. George rootstock were in good vigour and fruiting satisfactorily

* See also *H.A.*, 20: 2433.

at 44 years of age. The varieties varied in inherent vigour, as judged by trunk measurements and weights of prunings. The differences in vigour between the varieties suggest that planting distances in commercial vineyards should be varied accordingly. Trunk circumferences were an indication of the vigour of the vines, giving a correlation of $.59 \pm .034$ with the pruning wood weights. [Authors' summary.]—U.S. Dep. Agric., Fresno, Calif.

2397. ROGOV, N.

Planting vineyards with young plants from cuttings. [Russian.]

Sad i Ogorod, 1951, No. 3, pp. 45-6, illus.

A method of planting rooted vine cuttings in their permanent quarters is described. The cuttings are made in autumn and stratified. Before planting they are placed with their lower ends in water where they remain for 5-7 days, not longer. Selected cuttings are then planted in boxes or pots to the depth of an internode. In the beginning of May they are planted out in the vineyard in holes 25×25 cm. and 60 cm. deep, being covered with earth to the base of the lowest side shoot. Soil is added from time to time as the shoots elongate until the hole is finally full.

2398. PEYER, E.

Die Düngung der Reben. (The manuring of vines.)

Schweiz. Z. Obst- u. Weinb., 1951, 60: 96-9.

Following heavy crops in the vineyards of eastern Switzerland in 1950 recommendations on manuring are made, based on the preceding yield, the nature of the soil and the vigour of the plants.

2399. KORNEICUK, V. D.

Applying fertilizers in holes. [Russian.]

Vinodelie i Vinogradarstvo, 1951, No. 3, pp. 23-4, illus.

The application of fertilizers in holes is described. As the method is not yet adapted to mechanization it is suitable only for small plots with vines of high quality, and for vineyards on slopes that are unsuitable for horse or tractor work. Increased yields obtained by this method are tabulated.

2400. WILHELM, A. F.

Zur Kenntnis von Kalimanglerscheinungen bei der Weinrebe *Vitis vinifera* L. (The recognition of potash deficiency in the grape vine.)

Phytopath. Z., 1950, 17: 240-65, bibl. 10, illus.

The symptoms of potash deficiency in grape vines are described in detail and illustrated in 4 coloured plates and 10 other figures. Interveneal and marginal "scorch" are the usual symptoms.—Institute for Viticulture, Freiburg.

2401. BOUBALS, D., AND HUGLIN, P.

Observations sur la sensibilité au selant de certaines espèces et hybrides d'espèces du genre *Vitis*. (Observations on the sensitivity to salt of certain species and hybrids of vine.)

Progr. agric. vitic., 1951, 135: 145-6.

The effects of excess chlorides in the soil are discussed, and a list is given of some vine varieties showing their reaction to excess salt.

2402. MARTÍNEZ ZAPORTA, M., AND HIDALGO FERNÁNDEZ-CANO, L.

Período crítico de inversión de reservas en el género *Vitis*. (The critical period for inversion of reserves in the genus *Vitis*.) [English summary $\frac{1}{2}$ p.]

Bol. Inst. Invest. agron. Madrid, 1949, 9: 297-315, bibl. 17.

The transference of reserves in vines does not stop during the winter, and the date of its inversion is determined by the average temperature. The relations of the reserves from the time of defoliation to that of leafing have been established.

Nuts.

(See also 2572, 2966, 2967, 3088g, 3128.)

2403. GUENOT, —, HONNORAT, —, AND BALLOT, —.

Note sur la fructification des amandiers à la Station Régionale Horticole d'Ain Taoudjat. (The yields of almonds at the horticultural station at Ain Taoudjat.)

Terre maroc., 1950, 24: 461-2.

Almonds grafted on native seedling almonds showed no differences in growth attributable to rootstock effects. The yields of four grafted scion varieties are tabulated.

2404. GRAVES, A. H.

Chestnut breeding work. Report for 1948 and 1949.

Proc. 40th annu. Mtg north. Nut Grs' Ass. 1949, Beltsville, Md, 1950, pp. 85-94, illus.

The work reported has been carried on since 1930 and its chief aim is the development of a blight-resistant timber type of chestnut. Chestnut trees, owing to the attack of the parasitic fungus *Endothia parasitica*, have almost entirely disappeared from the forests of United States and are being seriously threatened in Italy. The most important results to date include several hybrids that have proved valuable for nut production.

2405. HARDY, M. B.

The propagation of Chinese chestnuts.

Proc. 40th annu. Mtg north. Nut Grs' Ass. 1949, Beltsville, Md, 1950, pp. 121-30.

The problem of incompatibility is discussed, and the use of *Castanea mollissima* rootstocks for topworking with *C. mollissima* scion varieties is recommended. The most favourable conditions for growing seedling trees are described. The budding or grafting of nursery trees and the top working of bearing trees should be done in the spring just as the bark of the stock begins to lift. Scions should be cut while still dormant and held in cold storage until used. Methods of budding and grafting are outlined.

2406. HAMMAR, H. E.

Harvesting and storing Chinese chestnuts.

Proc. 40th annu. Mtg north. Nut Grs' Ass. 1949, Beltsville, Md, 1950, pp. 130-4, bibl. 14.

Chinese chestnuts must be harvested daily or every two days, and after suitable curing the nuts should be placed immediately in cold storage at 32° to 45° F. Large tin cans with lids make satisfactory containers,

when provided with slight ventilation by nail holes near the top.

2407. COX, J. A., WOODWARD, R. S., AND ALBEN, A. O.
Pecan production in Louisiana.
Ext. Publ. La Div. agric. Ext. 1057,* 1950, pp. 11.

General directions are given for pecan growing. Ten suggested varieties are briefly described and a number are listed as unsuitable for Louisiana. Careful planning of orchards is necessary because of the longevity of pecan trees.

2408. ALBEN, A. O., AND SITTON, B. G.
Fourteen years' results of thinning the stand of trees in a pecan orchard on alluvial soil.
Proc. Amer. Soc. hort. Sci., 1950, 56: 98-102.

Part of a 30-year-old orchard of Stuart pecan trees, growing in a deep alluvial loam in Louisiana and spaced 65×67 ft., were thinned in 1936 to leave trees 93 ft. apart. Tree growth, yield and size of nuts and limb breakage were recorded for the subsequent 14 years. Allowing for such factors as manuring, aphid control and limb breakage, the unthinned trees yielded a higher net profit per acre due to the greater tonnage of nuts produced. Results more favourable to thinning might, however, be expected in more closely planted orchards.

2409. GERRITSEN, C. J.
 De vooruitzichten van de notenteelt. (**Prospects for walnut growing.**)
Fruittteelt, 1950, 40: 168-70, illus.

The possibilities of cultivating walnuts economically in the Netherlands are discussed. The characters looked for in selecting suitable varieties are set out.

2410. GLENN, E. M.
Walnut varieties.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 80-6, bibl. 7, illus.

Descriptions are given of trees, leaves, flowers and nuts of 16 walnut varieties, including 8 selected English varieties.

2411. ŠČEPOTJEV, F. L.
Twin walnuts. [Russian.]
Priroda, 1950, 39: 11: 56-9, illus.

Double walnuts and flowers which give rise to them were found at a Ukrainian research station in 1947 and 1948. Their characters are described and compared with those of normal nuts and flowers.

2412. ŠČEPOTJEV, F. L.
Metaxenia in the black walnut. [Russian.]
Priroda, 1950, 39: 11: 59-61, bibl. 6, illus.

Metaxenia in general is discussed and examples are given of the alteration in the fruits of the black walnut (*Juglans nigra*) induced by fertilizing its flowers with pollen from *J. regia* and *J. mandshurica*.

2413. CHASE, S. B.
The dwarfing effect of *Juglans rupestris*.
Proc. 40th annu. Mtg north. Nut Grs' Ass. 1949, Beltsville, Md, 1950, pp. 158-60.

* Formerly *Circ.* 269, issued 1947.

Thomas black walnuts grown in Tennessee on *Juglans regia* rootstocks are significantly larger than those grown on Texas walnut, *J. rupestris*.

2414. SORBER, D. G., AND KIMBALL, M. H.
The use of ethylene in harvesting the Persian walnut (*Juglans regia*) in California.
Tech. Bull. U.S. Dep. Agric. 996, 1950, pp. 80, bibl. 56, illus., 25c.

A comprehensive account is given of investigations carried out over the last 20 years on the ripening of walnuts, and of the development of ethylene treatment which hastens the loosening of the hulls and thus ensures the maximum percentage of light-coloured kernels. A description is given of the many defects found in walnut shells and kernels. Previously, French imported walnuts contained kernels which were consistently light-coloured and compared favourably with the Californian walnuts. Investigations showed that in the inland districts of California the kernels reached maturity 10 days to 4 weeks before the hulls matured and loosened, and that it was during this period that the colour of the kernels deteriorated. With the old method of harvesting the majority of walnuts had loosened hulls, but there was always a small proportion of relatively immature walnuts with unloosened hulls known as "green sticktights". The ethylene process was first developed for the loosening of green sticktight hulls, but since the facts concerning kernel and hull maturity became known it has been used for all walnuts harvested in many inland districts. Ethylene is used at a concentration of 1 part to 1,000 parts of air at 70°-90° F. Hull loosening follows within 60 hours. The chambers are ventilated every 12 hours to reduce humidity and CO₂ concentration. Sunburned, loose-hulled and decayed walnuts are removed mechanically before treatment. Hulling and dehydration are carried out soon after hull loosening. Walnuts grown in coastal districts do not require the ethylene treatment. C.W.S.H.

2415. DAGLISH, C.
The isolation and identification of a hydrojuglone glycoside occurring in the walnut.
Biochem. J., 1950, 47: 452-7, bibl. 12.

An amorphous compound C₁₈H₁₈O₈ has been isolated from ethanolic hydrochloric acid extracts of the walnut by chromatography on alumina. Spectroscopic examination suggests that this existed as such in the original plant. On hydrolysis it yielded glucose and α-hydrojuglone. Further chemical and spectroscopic evidence suggests that this compound is the 5-glucoside of 1:4:5-trihydroxynaphthalene. [Author's summary.]—Ovaltine Res. Lab., King's Langley, Herts.

2416. DAGLISH, C.
The determination and occurrence of a hydrojuglone glycoside in the walnut.
Biochem. J., 1950, 47: 458-62, bibl. 6.

A spectrophotometric assay for the 5-glucoside of 1:4:5-trihydroxynaphthalene has been applied to extracts prepared from various parts of the walnut (*Juglans regia*). Definite seasonal variations have been found for the concentration and the amount per unit of this substance. These have been discussed with regard to the possible role of this substance in the

economy of the plant. [Author's summary.]—Ovaltine Res. Lab., King's Langley, Herts.

2417. DAGLISH, C.

The identification of the "apparent vitamin C" of the walnut (*Juglans regia*) with hydrojuglone glucoside.

Biochem. J., 1950, 47: 462-6, bibl. 10.

The dye-titration values of hydrojuglone glucoside solutions and of walnut extracts are similarly affected by changes in pH and the time interval between the additions of the dye. Seasonal variations in concentration of the glucoside are similar to those of the "apparent vitamin C" in buds, catkins and fruits. These facts suggest that most of the "apparent vitamin C" in the buds, catkins and fruits of the walnut is hydrojuglone glucoside. A second non-specific dye reductant, probably a flavanone, has been found in the leaf. [Author's summary.]—Ovaltine Res. Lab., King's Langley, Herts.

Noted.

2418.

a BALTADORI, A.
Resistenza della vite al freddo. (Frost resistance in the vine.)
Ann. Fac. Agrar. Perugia, 1945, 3: 120-39, bibl. 18 [received 1951].

b BRANTINGHAM, J. A.
General 2,4-D damage to vineyards in the Kennewick area in 1950.
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, p. 194.

c CLORE, W. J.
2,4-D on grapes.
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, p. 195.
Drift damage.

d CORNU, C.
Précisions sur l'opération de paraffinage (adjuvant du greffage). (Notes on the use of paraffin wax as an aid in grafting.)
Progr. agric. vitic., 1951, 135: 171-2.
With particular reference to vine grafting.

e DURMIŠIDZE, S. V., AND BUKIN, V. N.
The physiological properties of tannins and colouring matter of the grape vine. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1951, 76: 703-6, bibl. 8.

f GRAVES, A. H.
Key to chestnut species with notes on some hybrids.
Proc. 40th annu. Mtg north. Nut Grs' Ass., 1949, Beltsville, Md, 1950, pp. 95-107, bibl. in text, illus.

g JACOB, H. E., AND WINKLER, A. J.
Grape growing in California.
Circ. Calif. agric. Ext. Serv. 116, revised 1950, pp. 80, illus.
For note on previous edition, see *H.A.*, 17: 2026.

h VAN KOOT, Y., VAN STAALDUINE, D., AND CAMFFERMAN, J.
Teelt en vruchtzetting van muscaatdruiven in België. (Cultivation and fruit-setting of Muscat vines in Belgium.)
Meded. Dir. Tuinb., 1950, 13: 417-24, illus.
Report on a study visit to Belgium.

i LOOMIS, N. H.
Use of Champanel and Dog Ridge grapes in breeding.
Proc. Amer. Soc. hort. Sci., 1950, 56: 140-4, bibl. 8.

PLANT PROTECTION OF DECIDUOUS FRUITS.

General.

2419. GROSJEAN, J.
Chemotherapie bij plantenziekten. (The chemotherapy of plant diseases.) [English summary ½ p.]
Meded. Dir. Tuinb., 1950, 13: 673-87, bibl. 42.

The subject is reviewed with reference to the treatment of deficiency diseases, and the control of pests and of diseases caused by fungi, bacteria and viruses. The action of antibiotics is discussed.

2420. RAUCOURT, M.
Revue de phytopharmacie. X^e Série. (A review of plant protection. X.)
Ann. Épiphyt., Ser. C, 1950, 1: 208-44, bibl. 176.

In this review the following are discussed: 1. Techniques for insecticide tests. 2. Mineral fungicides. 3. Insecticidal oils. 4. An insecticide little known in France, tartar emetic (double tartrate of antimony and potassium). 5. Growth substances in plant protection.

2421. COOK, H. T., AND OTHERS.
Plant pathological investigation in the United States II.
Plant Dis. Repr., 1950, Suppl. 195, pp. 383-518, bibls. numerous.

The supplement consists of a number of papers by different authors reviewing work that has been carried out in the United States on various aspects of diseases of cultivated plants. They include: Cook, H. T., "Investigations of diseases of fruits and vegetables in transit, storage and at the market, within the United States Department of Agriculture", pp. 383-97, bibl. 198; Doolittle, S. P., "Vegetable disease investigations in the United States Department of Agriculture, 1885-1950", pp. 398-412; Schultz, E. S., "Investigations on potato diseases by the Bureau of Plant Industry, Soils, and Agricultural Engineering, United States Department of Agriculture, 1910 to 1949", pp. 413-19; Dunegan, J. C., "Field and laboratory research on the diseases of hardy fruit crops conducted by the United States Department of Agriculture, 1885-1950", pp. 420-8; Fulton, H. R., "United States Department of Agriculture research on diseases of citrus and other

subtropical fruits, 1886-1950", pp. 429-32, bibl. 25; Cole, J. R., and Miller, P. W., "Investigations of nut diseases", pp. 433-6, bibl. 20; Brierley, P., "Disease investigations with ornamental crops in the United States Department of Agriculture", pp. 437-44; Steiner, G., "Plant nematology research in the Bureau of Plant Industry, Soils, and Agricultural Engineering", pp. 463-70.

Disturbances of nutrition or of unknown origin.

(See also 2339.)

2422. PROEBSTING, E. L.

A case history of a "peach replant" situation.

Proc. Amer. Soc. hort. Sci., 1950, 56: 46-8, bibl. 4.

Growth figures based on trunk circumference are given for 6-year-old Faye Elberta peach trees that replaced either peach or apple trees in an orchard at Davis, California. Where peach followed peach, development was retarded and there was a high degree of variability. Where peach followed apple, growth was not retarded, being similar to that of the original peach trees planted in the orchard, and was also more uniform. A hypothesis is suggested to explain the retardation and variation in peach following peach.

2423. KOBERNUSS, E.-C.

Zur Ursache und Behebung der Bodenmüdigkeit bei Obstgehölzen. (Vorläufige Mitteilung.) (The cause and elimination of soil exhaustion in orchards and fruit tree nurseries. (Preliminary communication.)) *Kühn-Arch.*, 1950, 63: 296-300, illus.

Pome and stone fruit rootstocks and trees grown on old nursery soils showed retarded growth similar to that exhibited by seedlings grown in boron deficient solution cultures. The addition of boron in both water culture and field experiments induced healthy root formation and normal growth of the aerial parts of the plants. Rates and times of application of boron to exhausted soils remain to be determined.—University of Halle.

2424. ANON.

Cork or boron deficiency disorders of pome fruits.

Agric. Gaz. N.S.W., 1950, 61: 519-21, illus.

Notes are given on fruit symptoms: superficial cork, cork, internal cork, corky core, and twig and foliage symptoms: incipient dieback, dieback, rosette. These disorders can be readily controlled by applying borax or boric acid to the soil in early spring. It is recommended that medium-sized trees receive $\frac{1}{2}$ lb. commercial borax and large trees 1 lb. If boric acid is used three-quarters of these amounts should be applied.

2425. VAN STUIVENBERG, J. H. M., AND POWWER, A.

Onderzoek over de bestrijding van "stip" bij notarisappels. (Investigation on the control of bitter pit in the apple variety Notaris.) [English summary 13 lines.] *Meded. Dir. Tuinb.*, 1950, 13: 201-11, bibl. 13.

It is claimed that bitter pit in apples was successfully controlled not only by borax but also by spraying in July with β -indolylacetic acid.

2426. BARBIER, G., CHABANNES, J., AND TROCMÉ, S.
Sur un dépérissement de vergers aux environs d'Orléans. (On the decline of orchards around Orleans.)

C.R. Acad. Agric. Fr., 1950, 36: 517-20.

A disorder of apple, pear and cherry trees, characterized by "rosettes" of small leaves, particularly towards the tips of the branches, is associated with a low zinc content of the leaves. Tabulated analyses show no differences in boron contents between the leaves of healthy and diseased trees. The disorder is thus presumed to be an effect of zinc deficiency, but experiments on its control have not yet been carried out.

2427. WOODBRIDGE, C. G.

A note on the incidence of zinc deficiency in the Okanagan Valley of British Columbia. *Sci. Agric.*, 1951, 31: 40, illus.

Reporting zinc deficiency for the first time in fruit trees in Canada, the author describes the symptoms observed on apples and control by dormant sprays of 20 lb. zinc sulphate per 100 gal. In some plots one application produced a response; in others sprays had to be applied 3 successive years.

2428. GIGANTE, R.

Ricerche preliminari sul mal del piombo non parassitario del pesco in provincia di Ravenna durante gli anni 1949 e 1950. (Preliminary research on non-parasitic silver leaf of peach in the province of Ravenna during 1949 and 1950.) [English and French summaries $\frac{1}{2}$ p.] *Riv. Fruttic.*, 1950, 12: 183-96, bibl. 22, illus.

Silver leaf symptoms in peaches observed in 1949 in the province of Ravenna, Italy, were found to be due in some instances to infection by *Stereum purpureum*, but in others it was not caused by any parasite. This non-parasitic form does not appear to be associated with cultural conditions or with mineral deficiencies, but a relation has been noted between the action of frosts and the development of the disorder.

2429. KLINKENBERG, C. H.

Voorjaarsbont in het aardbeiras Madame Moutot. (Spring variegation in the strawberry variety Madame Moutot.) *Fructteelt*, 1950, 40: 460.

Spring variegation in strawberries is characterized by yellowish green to light green or white spots or sectors on the leaves. It chiefly affects the variety Madame Moutot, but sometimes it is found on Oberschlesien, Scarlet, and Deutsch Evern. The fruit of affected plants remains small and useless. The runners of variegated plants are also variegated and strike root with difficulty. The disorder is not a virus disease but is regarded as a non-infectious mutation.

2430. PESANTE, A.

Sopra un caso di danneggiamento della vegetazione dovuto a sostanze catramose. (A case of damage to vegetation due to tarry substances.) [English summary 6 lines.] *Ann. Sper. agrar.*, 1951, 5: 179-200, bibl. 12, illus.

Attention is called to serious damage to vegetation caused by tarry fumes from a factory. The symptoms

are described and they are illustrated for melon, vine, walnut, pepper (*Capsicum*), kidney bean, paeony, and other plants.

Climatic factors.

(See also 2456, 3118.)

2431. WEINBERGER, J. H.

Prolonged dormancy of peaches.

Proc. Amer. Soc. hort. Sci., 1950, **56**: 129-33, bibl. 20.

The symptoms of prolonged dormancy [delayed foliation] in peaches are described and the literature on chilling requirements and on methods of prevention is reviewed.

2432. WEINBERGER, J. H.

Chilling requirements of peach varieties.

Proc. Amer. Soc. hort. Sci., 1950, **56**: 122-8, bibl. 6, illus.

Over 11 successive years at Fort Valley, Georgia, peach twigs of many varieties were taken indoors when 700 hrs., 900 hrs., and 1,100 hrs. of temperature of 45° F. or lower had accumulated. Their basal ends were placed in water and their subsequent bud development was observed. Orchard behaviour was also recorded for 83 varieties following the exceptionally mild winter of 1948-49 when only 880 hrs. occurred with temperatures at, or below, 45° F. and serious prolonged dormancy trouble ensued. From the data obtained it is concluded that in this southern peach-growing region the most dependable varieties are those which have a chilling requirement slightly above the minimum chilling accumulation on 15 February. A rest period of this intensity is sufficient to delay blossoming following normal or relatively cold winters until the frost hazard has passed but will not cause serious prolonged dormancy.

2433. PIQUER, G.

Le climat et les arbres fruitiers. La lutte contre les gelées de printemps. (Climate and fruit trees. Protection against spring frosts.)

Fruit belge, 1950, **18**: 157-9.

Measures are reviewed for protection against spring frosts, discussed under orchard heaters, utilizing infra-red rays, air movement, smoke screens and chemical mists, and the retardation of flowering.

2434. BRANAS, J.

Lutte contre les gelées. (Protection against frost.)

Progr. agric. vitic., 1951, **135**: 137-42, bibl. in text.

Measures that have been tried to prevent frost damage to vines are reviewed under (1) screens (artificial shelter, artificial clouds), (2) the inversion layer, and (3) submersion (flooding the soil). Other methods are also mentioned. The author concludes that they offer but few possibilities, and that the only practical means, i.e. smoke screens, cannot be expected to give wholly effective results.

2435. ROGERS, W. S., AND BEAKBANE, A. B.

The effect of netting and hessian anti-frost screens and of brick walls on air temperatures.

A.R. E. Malling Res. Stat. for 1950, 1951, **A34**, pp. 60-4, illus.

A single layer of thin string netting, hung from near the top of a brick wall, had no effect on air temperatures near the wall. Anti-frost screens of light hessian, however, gave useful protection from frost; on frosty nights the mean minimum air temperature beneath them was 4-8° F. higher than on an unscreened wall. The wall itself, in the absence of screening, caused a small (0-7° F.) but significant increase in minimum temperature over that at 5 ft. away, on frosty nights, in 1948; in 1947 the difference, though larger and in the same direction, was not significant. The maximum temperature on the wall was usually much higher than that 5 feet away, but rapid cooling from mid-afternoon onwards resulted in the differences being relatively small on cold nights. Box-like hessian screens over isolated mature trees usually gave temperature increases of 1° or 2° F. above that in unscreened trees in frosty nights.

2436. YEATES, J. S.

Farm trees and hedges.

Bull. Massey agric. Coll. **12**, revised 1948, pp. 221, illus. [received 1951].

This bulletin consists of three sections: A. General, discusses reasons for planting trees and hedges on farms, planning lay-out, shelter belts, farm firewood, etc., mistakes, planting young trees and hedges, trimming, points to be considered in choosing a farm hedge, ecology of farm trees, and planting against soil erosion. B describes the main farm trees, and C common hedge plants.

Viruses.

2437. ROSS, A. F.

Production of ethylene by virus-infected plants.

From abstr. in *Phytopathology*, 1951, **41**: 31.

Emanations, presumably of ethylene, in amounts much greater than from normal plants were detected and measured from several virus-infected plants, including potato and tobacco. Ethylene production appeared to be associated with necrosis. Species that normally respond by epinasty to exposure to ethylene showed epinasty in those cases in which large amounts of ethylene were detected.

2438. TOMLINSON, W. E., JR., MARUCCI, P. E., AND DOEHLERT, C. A.

Leafhopper transmission of blueberry stunt disease.

J. econ. Ent., 1950, **43**: 658-62, bibl. 3, illus.

Investigations from 1943 to 1948 in New Jersey have shown the leaf-hoppers *Scaphytopius magdalensis* and *S. verecundus* to be vectors of the virus disease, blueberry stunt. In large plots of mature plants DDT gave 95% control of the leaf-hoppers.

2439. POSNETTE, A. F.

Virus diseases of sweet cherries.

A.R. E. Malling Res. Stat. for 1950, 1951, **A34**, pp. 209-10, illus.

Virus symptoms seen on sweet cherry trees in England during 1949 and 1950 are illustrated and briefly described in 5 groups, viz. rosette, rasp-leaf, tatter-leaf, vein-clearing, and mottle.

2440. WELSH, M. F., AND WILKS, J. M.
Induced modification of symptom severity in little cherry.

Phytopathology, 1951, **41**: 136-8, illus.

In a tree severely infected with the little cherry virus disease a shaded part yielded fruits much larger than those of the unshaded parts.—Dom. Lab. Plant Path., Summerland, British Columbia.

2441. LEWIS, F. H.
The effect of ring spot and yellows on the yield of Montmorency cherry.

From abstr. in *Phytopathology*, 1951, **41**: 24.

The yield reduction by ring spot was greatest the first year symptoms appeared and proportional to the severity of the symptoms. Maximum yield reduction by yellows occurred several years after infection.

2442. MILBRATH, J. A.
Latent ringspot virus of cherries reduces growth of nursery trees.

Plant Dis. Repr., 1950, **34**: 374-5, bibl. 3, illus.

The differences between the growth of the virus-free stock and the regular nursery stock was quite apparent without comparative measurements. The mild strains of ringspot did not reduce the growth so much as the severe strains.

2443. GILMER, R. M.
Etiology and host range of X-disease of chokecherry.

From abstr. in *Phytopathology*, 1951, **41**: 14.

Field and greenhouse studies on certain of the Wisconsin strains of the X-disease virus are described. At least 4 strains were discovered. New hosts of the virus in the genus *Prunus* include: *P. domestica* var. Italian Prune, and *P. pennsylvanica*, both symptomless carriers, *P. maackii*, *P. padus*, *P. glandulosa*, *P. pumila*, *P. dunbari*, *P. maritima* and *P. tomentosa*. *P. serotina* is considered immune.

2444. WOLFE, H. R., AND ANTHON, E. W.
Western X-disease spread by insects.
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 128-9, bibl. 2.

While evidence for the transmission of Western X-disease of peaches by the geminate leafhopper, *Colladonus geminatus*, was produced in 1948, there is yet no definite proof that this vector is capable of transmitting Western X little cherry, caused by the same virus. Control measures and the existence of other vectors are discussed.

2445. DUNEGAN, J. C.
Chemicals for control of fruit diseases.
Agric. Chemls., 1951, **6**: 3: 35-7, 118-19.

This review of recent progress includes a brief discussion of the systemic treatment of X-disease of peaches.

2446. MOORE, J. D.
Relation of prune dwarf to sour-cherry yellows.

From abstr. in *Phytopathology*, 1951, **41**: 27.

Prune dwarf symptoms occurred on all Italian prune trees that had been inoculated with Montmorency cherry buds that had cherry yellows with latent necrotic ring spot, but not on non-inoculated controls nor on

trees inoculated with buds carrying cherry yellows with recurrent necrotic ring spot or latent necrotic ring spot alone.

2447. CADMAN, C. H., AND HARRIS, R. V.
Raspberry virus diseases: A survey of recent work.
A.R. E. Malling Res. Stat. for 1950, 1951, **A34**, pp. 127-30.

Progress is indicated in the identification and evaluation of raspberry viruses by the analysis of insect and graft transmissions to indicator hosts. Usefulness of insect transmission for this purpose is limited by the high resistance of red raspberry varieties (*Rubus idaeus*) to infection by this means, and because the highly susceptible *R. occidentalis* has proved not to be a differential indicator. The scope of graft analysis has recently been increased by using as indicators (a) an extended range of red raspberry varieties, and (b) the species *Rubus saxatilis* and *R. henryi*. Nine types of virus disease are briefly described and provisionally grouped into those which are, and those which are not, expressed by all the indicator *R. idaeus* varieties used.

2448. DEMAREE, J. B., AND MARCUS, C. P.
Strawberry viruses in eastern United States, as expressed when transmitted to *Fragaria vesca*.

From abstr. in *Phytopathology*, 1951, **41**: 10.

Tests were made with 3 types of virus, the symptoms they cause being described.

2449. THORNBERRY, H. H., VATTER, A. E., AND BEESON, D. M.
Viruslike particles in strawberry plants with foliar variegation.

From abstr. in *Phytopathology*, 1951, **41**: 35.

Spherical virus-like particles have been demonstrated by electron microscopy in the juice of strawberry plants having foliar variegation. The particles are being tested for infectiousness.

Bacteria.

2450. MASON, C. L.
Orchard experiments on the control of bacterial spot of peaches.

From abstr. in *Phytopathology*, 1951, **41**: 25.

Tests were carried out on Elberta trees with various preparations. Applied at full pink stage the most effective treatments were sodium hypochlorite at 1 gal. of 5.25% solution per 100 gal. water, and fixed copper compound (50% Cu) at 3 lb. per 100 gal. water. In tests involving variations in time of application and materials, zinc bordeaux, applied weekly from petal fall to one month before harvest, was outstanding.

2451. CARPENTER, T. R.
The elimination of fireblight-susceptible individuals in interspecific crosses of pear.

From abstr. in *Phytopathology*, 1951, **41**: 6.

Tests are described in which F_1 seedlings of pear crosses, involving the parental species *Pyrus ussuriensis* and *P. serotina*, were inoculated with *Erwinia amylovora* in early growth stages in a greenhouse and in later growth stages in the nursery. Seedlings grown in sand at different levels of N and mineral salt concentrations

failed to demonstrate great differences in resistance or susceptibility, but more susceptible individuals were eliminated in standard Hoagland's solution than in solutions of higher or lower concentration. The most favourable temperature found for eliminating susceptible individuals was 25° to 26° C.

Fungi.

(See also 3129.)

2452. PETTINGA, J. J.
De honingzwam (*Armillaria mellea* (Vahl) Sacc.). (The honey fungus.)
Fruiteelt, 1950, 40: 886.

Armillaria mellea and the damage it causes are briefly described. The usual measures for controlling it are mentioned—digging a trench round the affected tree, removal of the earth round the stem to expose the upper roots, removal of infected bark and rhizomorphs, and good drainage. It is claimed that good results were obtained by disinfecting the exposed roots with a 1% solution of sublimate. It is also recommended to add lime to the soil when covering the exposed roots.

2453. RHOADS, A. S.
Clitocybe root rot of woody plants in the southeastern United States.
Circ. U.S. Dep. Agric. 853, 1950, pp. 25, bibl. 33, illus.

Clitocybe root rot, caused by the fungus *Clitocybe tabescens*, is a destructive disease of fruit, forest, shade and ornamental trees, shrubs and vines. Preventive and remedial measures are discussed. Surgical treatment and exposing the root crown to aeration and drying have proved effective in combating the disease. Banking the soil to a point well above the partially girdled bases of treated trees, to stimulate the development of new root systems from the callus formed at the margin of the living bark, has been found to hasten the recovery of trees greatly weakened by loss of roots and partial girdling.

2454. STRUBLE, F. B. AND KEITT, G. W.
Variability and inheritance in *Glomerella cingulata* (Stonem.) S. and V.S. from apple.
Amer. J. Bot., 1950, 37: 563-76, bibl. 20, illus.

The main objectives of this study carried out at the University of Wisconsin, Madison, were to explain certain variant behaviour observed in *Glomerella cingulata*, the incitant of bitter rot in apples, and to consider the adaptability of the fungus to a genetic study.

2455. CROSSE, J. E., AND BENNETT, M.
Black rot and leaf spot of apple due to *Physalospora obtusa* (Schw.) Cooke.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 137-8, bibl. 3, illus.

An outbreak of leaf spot and black rot of apple fruits on the tree caused by *Physalospora obtusa* in its *Sphaeropsis* stage is described. What appears to be the same fungus was found overwintering on dead wood. The apparent failure of sprays to control the disease completely emphasizes the importance of removing dead wood, mummied apples, prunings and any other substrate on which the fungus might overwinter.

2456. MOORE, M. H.
Brown rot of apples: note on infection associated with hail bruises and lenticels.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, p. 131, bibl. 3, illus.

Brown rot infection (*Monilia fructigena*) has been noted in Bramley's Seedling apples in the plantation through (1) small skin-fissures overlying hail bruises, and (2) a lenticel.

2457. BOUGARD, M.
L'oidium du pommier. (Apple powdery mildew.)
Courr. hort., 1950, 12: 540-3.

Apple powdery mildew is described, and varieties of apple very susceptible, moderately susceptible, and resistant are listed. The rootstock has an effect on the degree of susceptibility; thus certain varieties are more susceptible on EM. I than on other rootstocks, while EM. XVI makes the scions relatively resistant. Certain rootstock varieties under propagation in the nursery are themselves more susceptible than others; I, II, IV and XI become severely affected, while the mildew is rare on IX, XII, XIII and XVI. Measures for controlling mildew include winter treatment with carbolineum and the application of sulphur preparations before and after the blossoming period, the later sprays containing wettable sulphur.

2458. SPRAGUE, R.
Powdery mildew spray trials at the tree fruit station in 1950.
Proc. 46th annu. Mig Wash. St. hort. Ass., 1950, pp. 162-6.

The most practical spray combination at Wenatchee against powdery mildew on Jonathan was 2.5% lime-sulphur at the pink bud, and 2% at the calyx stage, and 3 lb. of wettable sulphur per 100 gal. about 2 weeks later as the first cover spray.

2459. QUANJER, H. M.
Een historisch gegeven over appelschurft. (A historical note on apple scab.) [English summary 3 lines.]
Tijdschr. PLZiekt., 1951, 57: 65, illus.

In this note Dr. Quanjier points out that one of the oldest indications of the occurrence of apple scab is in the picture by Michel Angelo Caravaggio (± 1600) named "Christ and the two disciples at Emmaus" (National Gallery, London), which shows a dish of fruit with apples bearing scab lesions clearly shown (as seen in detail photograph).

2460. VLASVELD, W. P. N.
Het schurftonderzoek in de jaren 1947 en 1948 en de waarnemingen in 1949. (Investigations and observations on scab disease in 1947, 1948 and 1949.) [English summary 1½ p.]
Tijdschr. PLZiekt., 1951, 57: 15-32, bibl. 15.

Details are given of measures adopted in the Netherlands for issuing spray warnings for the control of apple scab. For pre-blossom spraying copper and mercury preparations are used. Mercury compounds may have a rather weaker fungicidal action but are becoming more widely used since they give smoother fruits and better foliage. When temperatures are high enough, sulphur compounds may be used, and after

flowering they are the most important fungicides, especially in the form of wettable sulphur. Sulphur-sensitive apple varieties are usually sprayed during the summer with a weak solution of mercury compounds. The expensive TMTD (tetramethylthiuram-disulphide) compounds have a weaker fungicidal action than the other sprays but they give very fine foliage and well-coloured fruits.

2461. SMITH, F. O., AND BUCHHOLTZ, W. F.
Evaluation of apple fungicides for Iowa.
From abstr. in *Phytopathology*, 1951, 41:
32-3.

All materials tried held early scab below 1%; however, infection on trees sprayed with Puratized Agricultural spray (phenyl-mercuritriethanol ammonium lactate) and with Tag (phenyl mercuric acetate) was less than half that on any others.

2462. GROMOBAJA, E. F.
The application of combination spraying in the orchard. [Russian.]
Sad i Ogorod, 1951, No. 3, pp. 34-5.

From experimental results a combination spring spray for the control of apple scab and California scale [? *Aonidiella aurantii*] consisting of a mixture of 4% bordeaux and 4% winter oil emulsion is recommended for application in the period from the swelling of the buds to the green bud stage.

2463. KOELLREUTER, J.
Morphologie und Biologie von *Rhabdospora ramealis* (Desm. et Rob.) Sacc. (The morphology and biology of *Rhabdospora ramealis*.)
Phytopath. Z., 1950, 17: 129-60, bibl. 29, illus.

This is a detailed account of the fungus which causes the purple blotch disease on canes of cultivated blackberries in Europe [including Britain]. The fungus overwinters as mycelium within the canes. Varieties from America are said not to have reacted to artificial inoculation.

2464. FINK, H. C., AND HOBART, O. F., Jr.
Fungicidal control of leaf spot and mildew on nursery cherry trees in Iowa.
From abstr. in *Phytopathology*, 1951, 41: 12.

For leaf spot [*Coccomyces hiemalis*] control bordeaux mixture was most effective. For powdery mildew [*Podosphaera oxycanthae*] control tribasic copper sulphate (4-100), bordeaux, and Phygon (4-100) were most effective in that order.

2465. PAVARI, A.
La lotta contro il cancro corticale del castagno. (The control of chestnut bark canker.)
Humus, 1951, 7: 3: 9-13, bibl. 8, illus.

The chestnut canker (caused by *Endothia parasitica*) problem in Italy and America is reviewed. Hygienic and cultural methods have proved inefficient as control measures and the author considers that the only promising approaches to the problem are a search for resistant varieties of *Castanea sativa*, and the introduction of resistant species from the Far East or of hybrids between them and American and European varieties. Action being taken along these lines in Italy is outlined.

2466. PETERSEN, D. H., AND CATTION, D.
Peach blossom blight control experiments.
Quart. Bull. Mich. agric. Exp. Stat., 1951, 33: 218-22, bibl. 3.

Various blossom sprays were tried on peaches in Michigan for the control of *Monilinia fructicola*. The results showed wettable sulphur to be somewhat superior to L.8277 and liquid lime-sulphur to be better than either, while experimental fungicides L.7752 and L.8299 gave almost complete control.

2467. HOUTMAN, G.
"Witvlekkigheid" van het pereblad. (White spotting of pear leaves.)
Fruiteelt, 1950, 40: 806-7, illus.

An account is given of "pear fleck" (*Mycosphaerella sentina*), particularly on the fruit and leaves of the variety President Loutreuil in an orchard where other varieties showed practically no fruit spotting. In one orchard spraying with bordeaux mixture against scab had little effect on leaf fleck.

2468. GROSJEAN, J.
De vatbaarheid voor loodglansziekte van een aantal pruimenrassen. (The susceptibility of a number of plum varieties to silver leaf disease.)
Fruiteelt, 1950, 40: 190-2, illus.

Observations on silver leaf are recorded for a 5-year period on 10 varieties of plum grown in the Netherlands. Data tabulated show the relative susceptibility and the recovery from the disease during the period. Early Rivers was one of the most resistant varieties; Victoria, Early Laxton and Belle de Louvaine were the most susceptible and showed fewest recoveries.

2469. STODDARD, E. M.
A chemotherapeutic control of strawberry red stele.
From abstr. in *Phytopathology*, 1951, 41: 34.

The red stele disease of strawberry, caused by *Phytophthora fragariae*, has been controlled by soil applications of disodium ethylene bisdithiocarbamate (Dithane D-14). There is evidence that the chemical acted therapeutically and not as a soil sterilant, and thus provides a new approach to the control of root diseases. Plots of strawberry plants were sprayed with the preparation and the plants were then planted in infested untreated soil without further treatment. The results were 70% to 100% control.

2470. BRAUN, A. J., AND EMERSON, F.
Control of black rot of grapes without direct coverage of the fruit.
From abstr. in *Phytopathology*, 1951, 41: 5.

Using the fungicide ferbam it was found that the control of black rot (*Guignardia bidwellii*) on bunches not receiving a direct application was equal to that obtained on the bunches from vines receiving the 7-day application in the conventional manner, i.e. with particular attention to the coverage of each bunch.

2471. NELSON, K. E.
Factors influencing the infection of table grapes by *Botrytis cinerea* (Pers.).
Phytopathology, 1951, 41: 319-26, bibl. 10.

Tokay grapes were infected by *Botrytis cinerea* through the uninjured skin. Lenticels, insect punctures and

microscopic injuries were not essential for infection. Grapes became infected from conidia only when the berries were kept wet after inoculation, the length of the moisture period necessary to produce infection varying with the temperature. The sugar content of non-infected berries was significantly lower than that of the healthy tissue of infected berries in the same cluster. Berries high in sugar are apparently more susceptible to botrytis infection.—Univ. Calif.

2472. MÜLLER-STOLL, W. R.

Versuche zum Problem der Wirksamkeit von Seifen- und Seifenersatzmitteln gegen den Traubenschimmel (*Botrytis cinerea*). (The effectiveness of soap and of soap substitutes against grey mould (*Botrytis cinerea*) of grapes.)

Phytopath. Z., 1950, 17: 265-86, bibl. 12.

Soap and soap substitutes had no pronounced toxic effect in plate cultures of *Botrytis cinerea* or on infections made on living fruit.

Nematodes.

(See also 2421.)

2473. RASKI, D. J., AND ALLEN, M. W.

Spring dwarf nematode.

Calif. Agric., 1948, 2: 23-4 [received 1951].

The spring dwarf nematode, *Aphelenchoides fragariae*, causes a disease of strawberry that is commonly known as dwarf or crimp. The nematodes infest the leaf buds and cause distortion and crinkling of the leaves as well as reduction of leaf size. They also attack fruit buds, causing blindness and a consequent reduction in fruit yield. Results of preliminary tests indicate that parathion is toxic to the nematode when applied as a spray in the field.

2474. LINDHARDT, K.

Jordbaerål. (Strawberry eelworm.)

Gartner-Tidende, 1950, 66: 202-3, from abstr. in *Helminth. Abstr.*, 1950, 186a.

The symptoms of attacks on strawberry by *Aphelenchoides fragariae* are described. Very little is known of the distribution of this parasite in Denmark but it is certainly rather common. Some differences in resistance have been found, the variety Dubdahl being the most susceptible. Control by chemicals has not yet been successful. Parathion is not satisfactory and methyl bromide has no effect.

Mites.

(See also 2486, 3093, 3126.)

2475. TOMLINSON, W. E., Jr.

Summer oil sprays to control blueberry bud mite.

J. econ. Ent., 1950, 43: 727.

Practical control of the blueberry bud mite, *Aceria vaccinii*, was obtained in New Jersey with a post-harvest application of a 3% summer oil. The fruit buds suffered no injury.

2476. BOUBALS, D., AND HUGLIN, P.

L'acariose. (Acarinosis.)

Progr. agric. vitic., 1951, 135: 272-7, bibl. 7, illus.

A destructive infestation of young vines near Montpellier by the acarid *Epitrimerus vitis* in April, 1951, is described. The development of shoots was arrested, the internodes remained short and slender, and the leaves on infested shoots were small with incurved margins. The numerous punctures gave the leaves a mosaic appearance. In severe cases the small branches perished. The biology of the mite is described and control measures, chiefly by spraying lime-sulphur, are discussed.

2477. STUBBINGS, W. A. K.

Studies on the bionomics and control of the pear bud mite (*Eriophyes piri*, Pag.).

Sci. Bull. Dep. Agric. S. Afr. 270, 1947, pp. 92, bibl. 78, illus. [received 1951].

The difference in seasonal history between the bud-infesting and leaf-blistering types of *Eriophyes piri* are discussed and a comparison is made between systematic characters of mites from blisters and from damaged buds. It is concluded that the type causing injury to fruit buds in the western Cape Province should be regarded as a distinct form of *E. piri*. It has been found that elemental sulphur of a suitable fineness, preferably neutral wettable sulphur, will give better control than lime-sulphur. It is most effective applied against the mite after blossoming is completed and all infested fruit buds have disintegrated and dropped. Nicotine sulphate, at 1 in 100 with a casein-lime spreader, also proved effective.

2478. BLAIR, C. A.

Damage to apple leaves by the fruit tree red spider mite, *Metatetranychus ulmi* (Koch).

A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 152-4, bibl. 6, illus.

Methods are described for the estimation of the extent of leaf damage caused by the fruit tree red spider mite, and the relationship of the degree of damage shown by different varieties to the number of palisade layers present in the leaf is discussed. An instance of winter egg-laying at an unusually early date was related to exhaustion of the food supply in badly affected leaves.

2479. MARLÉ, G.

Observations on the dispersal of the fruit tree red spider mite, *Metatetranychus ulmi* (Koch).

A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 155-9, bibl. 5.

Investigations on the conditions under which air dispersal of the fruit tree red spider occurs are described under laboratory experiments, field experiments, suction traps, effect of predators on dispersal, and dispersal other than by wind. Most of the migrating mites are adult females, which disperse at periods of peak population in each generation; the numbers moving are dependent upon the degree of infestation of the host. Parachute threads are normally formed in still air, after relatively calm periods, when temperatures are above 70° F. and relative humidities low.

2480. CLARK, P. G.

Experiments with parathion and TEPP to control red spider.

Grower, 1951, 35: 615-17.

In trials conducted on apples in Kent, parathion and TEPP were found to be better acaricides than derris;

however, owing to the destruction of predators by the phosphorus insecticides a heavy build up of red spider followed.

2481. UNDERHILL, G. W.
Timing early sprays for summer control of European red mite.
J. econ. Ent., 1950, 43: 637-9.

Good control of the early-season outbreak of mites, *Paratetranychus pilosus*, was obtained at the Virginia Agricultural Experiment Station with a single, petal-fall application of parathion or dinitro compounds. This is considered to be a satisfactory alternative to the dormant or delayed-dormant oil treatment.

2482. O'NEIL, W. J., AND WEEKS, G. W.
Observations on the distribution and behavior of the Willamette mite in north central Washington.
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 101-2.

The biology of the Willamette mite, *Tetranychus willamettei*, closely resembles that of the Pacific mite [*Tetranychus pacificus*]. While thorough spray coverage and residual acaricidal effect or repeated applications are required for satisfactory control, it is unnecessary to spray the cover crops as the mite is restricted to woody hosts.

Insect pests.

(See also 3109, 3117.)

2483. COLLYER, E.
A method for the estimation of insect populations on fruit trees.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 148-51, bibl. 5, illus.

A method for the accurate estimation of insect populations on apple trees is described. Pyrethrum in oil is atomized to form a cloud which envelops the tree and causes a rapid knock-down of insects, which can then be collected from sheets beneath the tree. Details of the atomizing bottle are shown in a drawing and photographs show the disposition of the atomizers and groundsheet.

2484. SOURES, B.
Contribution à l'étude des Lépidoptères de la Tunisie. Biologie des espèces nuisibles ou susceptibles de le devenir. (Contribution to the study of the Lepidoptera of Tunis. The biology of species injurious or likely to become so.)
Ann. Serv. bot. agron. Tunis., 1948, Vol. 21, pp. 211, bibl. 3, illus.

This account of the Lepidoptera of Tunis, illustrated by 89 figures, includes species occurring in floriculture, on fruit trees, and on ornamental shrubs and trees.

2485. KNOPPIEN, P., AND MELTZER, J.
Bloedluisbestrijding met HCH bevattende middelen. (Control of woolly aphids by application of insecticides containing BHC.) [English summary 5 lines.]
Meded. Dir. Tuinb., 1950, 13: 766-70.

In trials on apples with insecticides containing BHC, Bentox oil (5% BHC) gave the most favourable results.

2486. ANTHON, E. W.
Mites and aphids of stone fruits.
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 46-8.

Of 4 insecticides tested for mite control, parathion was the most effective. Parathion and 5 new insecticides, including 2 systemic, used for aphid control were almost equally satisfactory.

2487. LEEFMANS, S.
Onderzoekingen inzake de pereringlarve (Pereringworm) (*Agrilus sinuatus* Olivier). (Investigations on *Agrilus sinuatus* Oliv.) [English summary 2 pp.]
Meded. Dir. Tuinb., 1950, 13: 263-98, bibl. 13, illus.

This is a detailed account of the life-history and habits of the sinuate pear borer, with data on the flight period of the beetle in Holland. In control experiments sprays containing 0.5% arsenate of lead with $\frac{1}{4}$ % wheatmeal as adhesive, and wettable DDT powder were applied with promising results.

2488. MIELLER, H.
Der grosse braune Rüsselkäfer (*Hylobius abietis* L.), ein Vorratsschädling? (The large brown weevil (*Hylobius abietis* L.) a pest of stored products.)
Z. PflKrankh., 1949, 56: 198-200, illus. [received 1951].

Hylobius abietis, a serious pest of conifers, was found associated with damaged apples in storage. Tests showed that under certain circumstances the weevil could cause injury to apples and pears in store.

2489. FLEMING, W. E., AND HAWLEY, I. M.
A large-scale test with DDT to control the Japanese beetle.
J. econ. Ent., 1950, 43: 586-90.

A trial was carried out at Blowing Rock, N.C., where Japanese beetles, *Popillia japonica*, caused damage to fruit, vegetables and ornamental plants. A soil application of 25 lb. of DDT dust per acre to control the larvae and limited foliage sprays to kill the adult beetles prevented normal population increases and proved of value in suppressing isolated infestations.

2490. GOUGUENHEIM, M. R., PERRIER, D., AND RUNGS, C.
Remarques sur les larves de deux buprestides du système racinaire des rosacées fruitières (*Capnodis tenebrionis* L. et *Aurigena unicolor* Ol.). (Notes on the larvae of two buprestid pests of the root systems of rosaceous fruit trees.)
Reprinted from *Rev. Path. vég. Ent. agric. fr.*, 1950, 29: 152-7, bibl. 14, illus.

In addition to *Capnodis tenebrionis* L. a second buprestid species, *Aurigena unicolor* Ol., has been found attacking the roots of rosaceous fruit trees in Morocco. A table for the identification of the mature larvae of the two species is given.

2491. BREAKEY, E. P.
Control of strawberry root weevils.
Ext. Circ. Wash. St. agric. Ext. Serv. 169, 1951, pp. 4, illus.

The strawberry root weevils and the injury they cause

are briefly described. Control measures recommended include fruit baits and bran baits, the active ingredient being sodium fluosilicate, calcium arsenate, or sodium fluoride.

2492. HOUTMAN, G.

Over libellenschade op vruchtboomtakken.
(Dragon-fly damage to fruit tree branches.)
Fruitteelt, 1950, 40: 718-20, illus.

Injury to fruit trees in West Friesland is reported to have been caused by dragon-flies (species determined as *Lestes viridis* Vanderl.) which lay their eggs on the bark of branches overhanging the ditches between the orchards. The life-history of the dragon-fly is described. Control measures have not been determined.

2493. ANDISON, H., RICHARDSON, H. P., AND ROBINSON, A. G.
The currant fruit fly and its control in Canada.
Processed Publ. Canada Dep. Agric. Div. Ent. 46, 1951, pp. 2.

The life history of *Epochra canadensis* is outlined. It can be controlled by spraying with DDT at 1 lb. of 50% wettable powder to 100 gal. water, applied when 80% of the blossoms have withered or fallen, and again 10 days later.

2494. FALDI, G., AND OTHERS.

La sperimentazione antidacica Caffaro dell'anno 1949 con insetticidi clororganici.
(Experiments for the control of *Dacus oleae* with chloro-organic Caffaro products in 1949.)
Not. Mal. Piante, 1950, No. 11, pp. 75.

Experiments were carried out with DDT, HCH and other chloro-organic preparations for the control of the olive fly, *Dacus oleae*. The results were not conclusive but the preparations were considered to show considerable promise.

2495. PANSIER, E.

Contribution à la lutte contre le *Dacus oleae*.
(The control of the olive fly.)
Pomol. franç., 1950, 77: 75-6.

In trials for the control of the olive fly, 34.34% fruits on untreated trees were attacked and 15.34% on trees sprayed with DDT 40; the corresponding figures for Gesarol were 32.72% and 12.32%.

2496. MARTELLI, G. M.

Nuovo metodo di lotta contro la mosca delle olive. (A new method for the control of the olive fly.)
Ital. agric., 1951, 88: 223-8, illus.

In laboratory tests and field trials for the control of the olive fly (*Dacus oleae*) with a number of phosphorus preparations, xanthion (=parathion), as a spray or in powder form, gave good results against the larvae.

2497. PITCHER, R. S.

The raspberry cane midge and its control.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 211-12, illus.

A brief account is given of the biology of the raspberry cane midge (*Thomasiniana theobaldi* Barnes) and the subsequent invasion of the canes by fungi, particularly *Leptosphaeria coniothyrium*, the cause of cane blight.

From the results of four years' field trials two applications in May of benzene hexachloride wettable powder, 0.1% crude BHC (0.013% γ -isomer), are recommended for control.

2498. VENTURA, E., AND RAUCOURT, —.

Traitement par poudrage des pommiers à cidre, contre les chenilles défoliatrices.
(Dusting cider apple trees for the control of defoliating caterpillars.)
C.R. Acad. Agric. Fr., 1950, 36: 685-6.

The authors claim to show that dusting standard cider apple trees with arsenicals or DDT is practicable and effective against defoliating caterpillars.

2499. KIRBY, A. H. M.

Trials of zinc fluoroarsenate against codling moth, *Cydia pomonella*, L.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 160-3, bibl. 2.

Laboratory tests indicated that zinc fluoroarsenate yields less soluble arsenic when mixed with weak lime-sulphur than does the equivalent amount of lead arsenate. Phytotoxicity tests with such mixtures on Worcester Pearmain and Cox's Orange Pippin indicated that just as much leaf-damage may be caused by zinc fluoroarsenate as by lead arsenate, at least on Cox's Orange Pippin. Direct comparison of codling moth control by the two arsenates showed no indication of a difference in effectiveness. As zinc fluoroarsenate is a little more expensive than lead arsenate, and on most other grounds appears to offer no advantage over lead arsenate, there seems no reason at present to recommend its use for codling moth control on apples. [Author's summary.]

2500. CLARK, P. G.

The control of codling moth with parathion.
Grower, 1951, 35: 16-17.

While parathion did not give significantly better control of codling moth than lead arsenate, its use is thought advisable where red spider is troublesome at the end of June or early July.

2501. BEVILACQUA, I.

Della lotta contro la *Cydia pomonella* e la *Rhagoletis cerasi* nel modenese. (The control of codling moth and cherry fruit fly near Modena.)
Riv. Ortoflorofruttic. ital., 1951, 35: 44-8.

Promising results are recorded for the control of codling moth with a phosphorus preparation (Fosferno) and of the cherry fruit fly with Gesarol.

2502. CARLSON, F. W., AND NEWCOMER, E. J.

Preliminary observations on the habits and control of the pandemis moth.
Proc. 46th annu. Mig Wash. St. hort. Ass., 1950, pp. 99-100.

The moth *Pandemis pyrusana* has caused some injury to cherries and apricots in the Yakima Valley during the last few years, and was also found on prune and apple trees, though no economic loss occurred on these fruits. Experiments to determine the best method of control are briefly described, but results obtained do not yet warrant making recommendations.

2503. ROMAŠKO, I. S.

On the infestation of vine varieties by the leaf form of phylloxera. [Russian.]

Vinodelie i Vinogradarstvo, 1951, No. 3, pp. 38-40.

This is an account of varietal differences in degree of infestation by the leaf form of phylloxera, based on observations made on a collection of grapevines at the Soči (Sochi) institute.

2504. CHILDS, L., AND OLNEY, V. W.

Pear psylla and its control.

Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 201-9.

From experiments conducted in Oregon it would seem that a spray programme involving either parathion or EPN and capable of controlling mites is sufficient to control *Psylla pyricola*.

2505. KIRBY, A. H. M.

Chemicals for the control of apple sawfly.

A.R. E. Malling Res. Stat. for 1950, 1951, A34, p. 213.

Under conditions where nicotine has consistently given good control of apple sawfly [*Hoplocampa testudinea*] there is no reason to change from the usual 8 oz. of nicotine per 100 gal. at petal fall (i.e. when 80% of the petals have fallen). If sawfly has not been readily controlled by nicotine, BHC at 1 lb. per 100 gal. can be used when blossoming is complete (i.e. about a week after petal fall stage).

2506. HAMILTON, D. W.

***Profenusa canadensis*, a pest of English Morello cherries in Eastern New York.**

J. econ. Ent., 1950, 43: 694-6, bibl. 3.

BHC and chlordane have been found effective in controlling the sawfly leaf miner, *Profenusa canadensis*. The adult population can be materially reduced by 2 applications of BHC, one at the late pink stage and the other at petal fall. The use of DDT, while effective in killing the adults, is not recommended.

2507. STAFFORD, E. M., AND BARNES, D. F.

Sprays for fig scale control.

J. econ. Ent., 1950, 43: 730-1, bibl. 1.

Dormant oil sprays of 3 types gave approximately equal control of *Lepidosaphes ficus*. Parathion at 10 oz. of 20% wettable powder in 100 gal. of water applied in mid-May gave equal or better control than the oil sprays. Some variation in control was noted between different orchards when a 1 lb. parathion application was made at the end of June and early July. After 41 days no parathion residue was found on the figs.—Univ. Calif.

2508. SOLAROLI, V., AND BONGIOVANNI, G. C.

Prove di lotta invernale contro *Diaspis pentagona* Targ. (Trials of winter control measures against *Diaspis pentagona*.) [English and French summaries 10 lines each.]

Riv. Fruttic., 1951, 13: 27-37, bibl. 12, illus.

In trials with winter insecticides against *Diaspis pentagona* on peach trees the best results were given with lime-sulphur. In the Ferrara district of Italy the pest has 2 generations. The difficulty of using lime-sulphur in the same season that bordeaux mixture is

applied is noted, and other insecticides, such as white Winter Volck and Esso Spray no. 1, are then advised.

Other pests.

2509. MINISTRY OF AGRICULTURE, LONDON.

The magpie, the jackdaw and the jay.

Adv. Leaflet. Minist. Agric. Lond. 242, 1950, pp. 4, illus., 1d.

Short descriptions of these birds and their habits and food are given. The jay is fond of soft fruit and garden peas, and if not checked may sometimes do great damage in a very short time.

2510. COKER, E. G.

A progress report on experiments with rabbit repellents.

A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 87-9, bibl. 2.

Only one substance, compound 96A of the U.S. Fish and Wild Life Service, of 3 tested on bundles of apple shoots, showed promise. It caused only slight injury to 2-year-old rooted layers of 5 clonal apple stocks, but it caused damage when applied to cut surfaces or wounds.

2511. SHARP, S. S.

Insecticides.

Agric. Chemls, 1951, 6: 3: 32-4, 111-14.

Includes a discussion of the latest rodenticides for rat control, e.g. red squill, a-naphthylthiourea, Castrix (2-chloro-4-dimethylamino-6-methylpyridine), sodium fluoroacetate and Warfarin (3-(a-acetonyl-benzyl)-4-hydroxycoumarin).

Antibiotics.

(See also 2628, 2658, 2885.)

2512. WILSON, G. B.

Cytological effects of some antibiotics.

J. Hered., 1950, 41: 227-31, bibl. 10, illus.

A study was made of the effect of certain antibiotics on the roots of *Allium cepa*. The antibiotics used were penicillin G, streptomycin, neomycin, circulin, endomycin, actidione and streptothricin. Streptomycin was toxic at concentrations over 100 p.p.m., neomycin was toxic even at 6 p.p.m., and circulin was toxic at 12 p.p.m. Particular attention was paid to cytological effects and all the antibiotics gave indications of inducing "reductional groupings". Actidione produced marked shortening of the chromosomes, failure of the metaphase and formation of "reductional groupings". Streptothricin produced similar marked aberrations in mitotic behaviour. C.W.S.H.

2513. CURTIS, P. J., HEMMING, H. G., AND SMITH, W. K.

Frequentin: an antibiotic produced by some strains of *Penicillium frequentans* Westling.

Nature, 1951, 167: 557-8, bibl. 4.

Botrytis allii is among the organisms inhibited by frequentin, the germination of the conidia being prevented by 2.5 µgm./ml. at pH 3.5.—Butterwick Res. Labs, I.C.I. Ltd., Welwyn, Herts.

2514. OSBORN, E. M., AND HARPER, J. L.

Antibiotic production by growing plants of *Leptosyne maritima*.

Nature, 1951, 167: 685-6, illus.

An antibiotic of high activity was found to be present in *Leptosyne maritima* (Compositae). An examination of transverse slices showed that in the rosette and shooting stage the highest concentration of the antibiotic occurs in the "stock" region of the taproot. Plants grown in pots and in the open exhibited a very strong rhizosphere effect. Further experiments in progress revealed *inter alia* the inhibition of lettuce root growth by phytotoxic exudates of *L. maritima* roots.—Oxford Univ.

2515. LITTLE, J. E., AND JOHNSTONE, D. B.
Plumericin: an antimicrobial agent from
Plumeria multiflora.

Arch. Biochem., 1951, 30: 445-52, bibl. 12,
being J. Ser. Pap. Vi agric. Exp. Stat. 10.

Plumericin was isolated from the roots of *P. multiflora* and its formula was determined. The compound was found to have an antibiotic action against fungi as well as against gram-positive and gram-negative bacteria.

Fungicides.

(See also 2526.)

2516. BLUMER, S., AND KUNDERT, J.
Methoden der biologischen Laborprüfung
von Kupferpräparaten. (Methods for the
biological testing in the laboratory of copper
preparations.)
Phytopath. Z., 1950, 17: 161-99, bibl. 32,
illus.

A method of evaluating the fungicidal action of copper spray materials against conidia of *Alternaria tenuis*, *Venturia pirina*, *V. inaequalis*, *Clasterosporium carpo-philum*, *Monilia fructigena* and *Botrytis cinerea*, is described.

2517. JÜGAŇOVA, O. N.
The effect of different methods of preparing
and keeping copper naphthenate on its
adherence when washed with rain, its
discoloration and toxicity. [Russian.]
Doklady vsesojuz. Akad. sel'sk. Nauk, 1951,
16: 1: 34-8, bibl. 5.

The results are given of laboratory tests in which the toxic effect of copper naphthenate on conidia of *Monilia* [?] *cinerea* are recorded. The preparation proved to be as toxic when made by pouring together a cold solution of copper sulphate and petroleum soap and diluting immediately before use, as when prepared from hot solutions. Factory-prepared copper naphthenate in a solid form retained its toxicity for 8 years.

2518. HILBORN, M. T.
New organic spray for scab and mite control.
Amer. Fruit Gr., 1951, 71: 4: 22-3.

In experiments carried out in a Maine apple orchard in 1947-50 glyoxalidine fungicide spray showed considerable promise for controlling both scab and red mite.

2519. RICH, S., AND HORSFALL, J. G.
Gaseous toxicants from organic sulfur
compounds.

Amer. J. Bot., 1950, 37: 643-50, bibl. 10.

Working with closed systems, it was not possible to demonstrate any correlation between detectable H₂S

and toxic emanations from purified lots of nabam [an organic sulphur compound]. Tests comparing both SO₂ and ethylene thiourea with nabam showed that these compounds were also not involved directly in the fungicidal action of nabam. It is felt that no completely satisfactory theory has yet been offered to explain its fungicidal mechanism. It is hoped that a clue will be found by attempting to isolate and identify the gaseous toxicants from nabam solutions. [From authors' summary.]—Conn. agric. Exp. Stat., New Haven.

2520. FELIX, E. L.
Fungicidal adhesives.

From abstr. in Phytopathology, 1951, 41: 12.

Tests in Tennessee indicate that natural and synthetic resin emulsions such as Nu-Film and Resyn Adhesives 3024 and 3605, at the rate of 1 pt. to 100 gal. of spray material, are exceptionally good stickers for fixed coppers and bordeaux mixture, and deserve wider usage when residue is not a factor. They also act as spreaders.

Insecticides.

(See also 2511, 2518, 2536d, u, 2625.)

2521. MCKINLAY, K. S., KIRBY, A. H. M., AND ALLEN, M.
Experiments on increasing the penetration
of ovicides and insecticides.
A.R. E. Malling Res. Stat. for 1950, 1951,
A34, pp. 177-86, bibl. 5.

Benzyl alcohol will facilitate the penetration of the winter eggs of the fruit tree red spider mite by other ovicides, including azobenzene, azoxybenzene, *n*-dodecyl thiocyanate, and, to a lesser degree, bis (*p*-chlorophenyl) methyl carbinol (DMC). The low toxicity of diphenyl sulphone, a good summer ovicide for this pest, was not enhanced. A number of compounds related to benzyl alcohol also act as penetrants.

2522. AMOS, E. F.
Two years' experience with B.H.C.
Fruitgrower, 1951, No. 2884, pp. 623-4.

BHC used at bud burst, green cluster and post-blossom stages in 1949 and 1950 in a large apple orchard in East Sussex eliminated the need for a winter wash. Red spider practically disappeared and sawfly was completely controlled.

2523. BILIOTTI, E., AND VENTURA, E.
Effets de traitements aux insecticides
organiques de synthèse sur certaines popu-
lations de prédateurs auxiliaires: les coccin-
ellides. (The effect of synthetic organic
insecticides on certain predators of plant
pests: the coccinellids.)
C.R. Acad. Agric. Fr., 1950, 36: 725-8,
bibl. 7.

Results indicate that HCH has less insecticidal action on coccinellids than DDT and that HCH dusts in particular have little or no effect on them.

2524. KEARNS, H. G. H.
Recent research and development in sprays
and spraying of apples and pears.
Worcester. agric. Chron., 1951, 19: 113-21,
bibl. 3.

As a result of trials at the Long Ashton Research

Station the use of DDT as a substitute for winter washing was found to have certain advantages accompanied by some risk. When sprayed at bud burst, using Worcester Pearmain as a guide, complete control of leaf aphids, capsids, caterpillars, tortrix and blossom weevil was obtained but not of sucker, lichen and moss. Occasional tar-oil spraying is therefore desirable. Apart from apple blossom weevil good control was also obtained by applying DDT emulsion with lime-sulphur at the very early pink bud stage. Red spider had still to be controlled at petal fall stage. Two methods of "automatic" spraying are described and their advantages discussed.

2525. KIRBY, A. H. M., AND MCKINLAY, K. S.
Laboratory experiments on the toxicity of potential acaricides.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 164-71, bibl. 14.

Some improvements in laboratory testing of summer ovicides against the fruit tree red spider mite have been made. Two chlorinated hydrocarbons and two fungicides (Arathane and SR406) showed considerable ovicidal action; toxaphene has acaricidal action. Chlorinated analogues of benzyl benzoate, benzhydrol and phenyl benzenesulphonate have been tested. The implications of specificity in relation to acaricides and summer ovicides are discussed. Two chlorinated phenyl benzenesulphonates permeated leaves and killed eggs on the side opposite to that painted; this was also shown by parathion and para-oxon and to a lesser extent by azobenzene, but not by bis (*p*-chlorophenyl) methyl carbinol (DMC), nor by diphenyl sulphone (DPS). Para-oxon exceeds parathion in ovicidal activity, but the dimethyl and di-isopropyl homologues of parathion are less ovicidal. The organophosphorus compound E838 shows promise as an ovicide.

2526. KIRBY, A. H. M., AND FRICK, E. L.
The fungistatic activity of certain organophosphorus insecticides.
A.R. E. Malling Res. Stat. for 1950, 1951, A34, pp. 172-6, bibl. 5.

Three types of organophosphorus compounds tested against spores of apple scab and pear scab were (a) sparingly soluble in water and relatively persistent, (b) easily soluble in water and not persistent, (c) systemic. All three types contain compounds inhibiting germination of spores of one or both of the two fungi, but EPN300 of type (a) and schradan of type (b) were inactive at all concentrations tested. The inhibitory compounds were fungistatic, not fungicidal. Dosage-mortality curves have been plotted for parathion, its dimethyl homologue and para-oxon, and the ED₅₀ values derived for both fungi. The implications for fungitoxicity and pathogenicity trials involving these fungi are discussed.

2527. SOLAROLI, V., AND BONGIOVANNI, G. C.
Gli esterî fosforici contro alcuni emetteri.
(The use of phosphoric esters against certain pests.)
Ital. agric., 1951, 88: 208-14, illus.

Field trials near Ferrara with commercial preparations of phosphoric esters were carried out against the mealy plum aphid (*Hyalopterus arundinis*), the green apple

aphid (*Aphis pomi*) and the pear psyllid (*Psylla piricola*); the results here tabulated indicate that the phosphorus preparations are more effective than gammexane, chlordane or nicotine sulphate.

Spraying methods and apparatus.

(See also 2274, 2536a, j.)

2528. YOTHERS, M. A., AND WESTLAKE, W. E.
Preliminary studies on deposit of insecticides used against the cherry fruit fly.
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 41-4.

From results of residual analyses for lead arsenate and methoxychlor, in the Yakima Valley in 1950, it appears that application from the ground regardless of type of equipment used resulted in relatively heavy deposits on the lower parts of the trees and light deposits on the tops. Plane and helicopter applications gave a uniform coverage but relatively light deposits. Infestation studies have shown a 100% control obtained throughout, due probably to conditions being unfavourable for fly development and favourable for control.

2529. ASQUITH, D., AND LEWIS, F. H.
Spraying with mist concentrates reduces costs for orchardists.
Science for the Farmer, March 1951, pp. 7-8, illus., being *Suppl. 63rd A.R. Pa agric. Exp. Stat.* 1949/50, 2.

A comparison is made of the economics of apple spraying with a high pressure rig, a conventional Speed Sprayer and a Speed Sprayer converted for applying mist concentrates. The costs of each method are analysed in a table from which it can be seen that the total costs of applying a mist concentrate spray from a Speed Sprayer with 2 sides open is almost half that of applying a dilute spray from a conventional Speed Sprayer.

Spray residues and spray injury.

(See also 2324, 2594, 2832g.)

2530. KNOPPIEN, P.
Smaakproeven na toepassing van HCH bevattende bestrijdingsmiddelen. (Tasting trials on fruit sprayed with insecticides containing BHC.) [English summary ½ p.]
Meded. Dir. Tuinb., 1950, 13: 771-3.

With Yellow Transparent and Pomme de Coeur apples and Czar plums hardly any adverse flavour was experienced when a BHC spray was applied on 8 June. Spraying on 23 July either with Bentox or Hexyclan resulted in an unpleasant musty flavour in Pomme de Coeur. The flavour of Belle de Boskoop was badly affected by a spray containing 1% Bentox applied on 11 June.

2531. HALLER, M. H., AND CARTER, R. H.
DDT spray residues on apples and the effect of removal treatments.
Proc. Amer. Soc. hort. Sci., 1950, 56: 116-21, bibl. 8.

From trials with a large number of washing agents and from investigations reported elsewhere it is concluded that very little of a DDT residue can be removed from apples. Slight reductions of doubtful significance

were obtained with HCl and wetting agents, with HCl and light mineral oils, and with sodium silicate.—Plant Ind. Stat., Beltsville, Md.

2532. BRUNSON, M. H., AND KOBLITSKY, L.
A study of DDT deposits on peach foliage and fruit treated for control of the oriental fruit moth.
(Publ.) U.S. Dep. Agric. E.809, 1950, pp. 6, bibl. 2.

The residues on leaves from nine initial spray applications averaged $11.1 \mu\text{g. per sq. cm.}$ About 70% of the initial residue was lost during the week after the first application. The amount of DDT on the sprayed fruit at harvest time apparently depended on the schedule. Residues exceeded 7 p.p.m. in only 2 of 9 treatments in which 2 or 3 sprays were applied at intervals of 3 or $3\frac{1}{2}$ weeks. There was more than 7 p.p.m. of DDT on the fruit in all plots in which 3 sprays were applied at 2-week intervals.

2533. WESTLAKE, W. E.
The effect of new insecticides on the soil.
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 169-74, bibl. 16.

The literature on the toxicity to plants of DDT, BHC, and parathion accumulation in the soil is reviewed. Analyses carried out in a number of DDT-sprayed apple orchards near Yakima have shown that the DDT content in the soil increased from year to year. The highest concentrations were found in the top layers of soil, and penetration downward appeared to be caused through cultivation.

2534. ACKLEY, W. B., WALKER, K. C., AND BENSON, N. R.
DDT residues in orchard soils.
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 85-8, illus.

Results of a study described indicate that DDT accumulates in the surface soil, particularly under the spread of the trees. With DDT spray programmes the accumulation is rapid during the first year or two, but may become slower afterwards. Beyond a certain minimum concentration DDT in the soil is toxic to plants, the toxicity depending largely on the soil type. Apple trees appear to be very tolerant, and the amount of DDT that accumulates in Washington orchards may not harm either the trees or cover crops.

2535. JAIVENOIS, A.
Les causes des brûlures provoquées par les traitements antiparasitaires. (Scorch caused by fungicides.)
Fruit belge, 1951, 19: 73-9, illus.

This article describes injuries to apples and pears due to (1) wrong choice of fungicide or faulty preparation, (2) improper application, (3) the reaction of the leaves or fruit, (4) atmospheric conditions with particular reference to sulphur compounds.

Noted.

2536.
a ANON.
Special plane applies pesticides and fertilizer.
Agric. Chemls, 1951, 6: 4: 41, 117-18, illus.
The machine and its performance are described.

- b BRAUN, A. J.
Verticillium wilt now recognized as a destructive disease of strawberries in New York State.
From abstr. in *Phytopathology*, 1951, 41: 4.
It causes discoloration, stunting, wilting and death.
- c BREakey, E. P., AND WEBSTER, R. L.
Insect pests of small fruits.
Ext. Bull. Wash. St. agric. Ext. Serv. 450, 1951, pp. 36, illus.
- d BRIGHT, N. F. H., CUTHILL, J. C., AND WOODBURY, N. H.
The vapour pressure of parathion and related compounds.
J. Sci. Food Agric., 1950, 1: 344-8, bibl. 14.
- e CARTER, W.
The oriental fruit fly: progress on research.
J. econ. Ent., 1950, 43: 677-83, bibl. 7.
- f COTTON, R. T.
Notes on the almond moth.
J. econ. Ent., 1950, 43: 733.
- g DEAN, F. P., AND NEWCOMER, E. J.
Results with acaricides in 1950.
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 103-4.
A brief report on 11 chemicals tested in Washington State.
- h FÉRON, —,
Bases biologiques de la lutte contre le capnode (*Capnodis tenebrionis* L.). (Biological principles in the control of capnodis.)
C.R. Acad. Agric. Fr., 1950, 36: 636-8.
Notes on the life cycle of capnodis on stone fruit trees.
- i FÉRON, —,
Techniques utilisées dans la lutte contre le capnode. (Devices used in capnodis control.)
C.R. Acad. Agric. Fr., 1950, 36: 638-9.
On the use of HCH against (1) the adult insects, (2) the larvae.
- GUILLOU, R.
Friction in spray hoses, pipes and fittings.
Agric. Ext. Circ. Hawaii agric. Ext. Serv. 304, 1951, pp. 4.
- k HILBORN, M. T., AND LATHROP, F. H.
Organic fungicides in the control of apple scab and European red mite.
Phytopathology, 1951, 41: 52-5, bibl. 4.
See *H.A.*, 20: 711.
- l HOBBS, G.
Investigations on a cucumber virus mechanically transmitted from sour cherry.
From abstr. in *Phytopathology*, 1951, 41: 16.
- m KEITT, G. W., AND BOONE, D. M.
Gene pairs conditioning pathogenicity in *Venturia inaequalis*.
From abstr. in *Phytopathology*, 1951, 41: 19-20.

- n KENKNIGHT, G.
The acid test for phony disease of peach and its diagnostic value.
From abstr. in *Phytopathology*, 1951, 41: 20-1.
- o KLINKENBERG, C. H.
Wortel- en stengelziekten van aardbeien. (Fungous root and stem diseases of strawberries.) [English summary 4 lines.]
Meded. Dir. Tuinb., 1950, 13: 758-65, bibl. 5, illus.
- p MOWRY, J. B.
Cross inoculation of *Prunus* with *Cocco-mycetes*.
From abstr. in *Phytopathology*, 1951, 41: 27.
With 66 species, varieties and hybrids of *Prunus*.
- q PETRAHILEV, I.
Windbreak strips for gardens in the Siberian steppes. [Russian.]
Kolhoz. Proizv., 1950, No. 6, pp. 23-4.
See also *H.A.*, 20: 2489.
- r POWELL, D., CHANDLER, S. C., AND KELLEY, V. W.
Pest control in commercial fruit plantings.
Circ. Ill. Agric. Ext. Serv. 678, 1951, pp. 39.
A revision of circular 653 [see *H.A.*, 18: 1709].
- s SHAY, J. R., AND HOUGH, L. F.
Variation in pathogenicity of *Venturia inaequalis* to scab-resistant *Malus*.
From abstr. in *Phytopathology*, 1951, 41: 32.
- t SUBBA RAO, N. V., AND POLLARD, A. G.
Photo-decomposition of rotenone in spray deposits. I. Colorimetric determination of rotenone in spray deposits and residues. II. Laboratory technique for producing replicate deposits.
J. Sci. Food Agric., 1950, 1: 367-71, bibl. 17, and 1951, 2: 176-80, bibl. 17.
- u TOPLEY, B.
Insecticidal phosphorus compounds.
Chem. Industr., 1950, No. 53, pp. S 859-68.
A discussion of their chemistry.
- v WAKELAND, C., AND PARKER, J. R.
Grasshopper control with aldrin, chlordane, and toxaphene.
(*Publ.*) *U.S. Dep. Agric. PA-149*, 1951, pp. 12.
- w WOODCOCK, D., AND STRINGER, A.
The insecticidal activity of parathion, its isomers and some related compounds.
Ann. appl. Biol., 1951, 38: 111-20, bibl. 9.
The test insects were adult grain weevils (*Calandra granaria* L.).
- x YOTHERS, M. A.
Oriental fruit moth investigations in the Yakima district in 1950.
Proc. 46th annu. Mtg Wash. St. hort. Ass., 1950, pp. 37-9, bibl. 3.

WEEDS AND WEED CONTROL.

Herbicides.

(See also 2251, 2570f, 3110.)

2537. MUZIK, T. J., LOUSTALOT, A. J., AND CRUZADO, H. J.
Movement of 2,4-D in soil.
Agron. J., 1951, 43: 149-50, bibl. 1.

It was established that, on a silty clay loam in Texas, sodium 2,4-D did not penetrate more than 1 in. below the surface even when the application was followed by heavy rain.

2538. AKAMINE, E. K.
Persistence of 2,4-D toxicity in Hawaiian soils.
Bot. Gaz., 1951, 112: 312-19, bibl. 36.

The persistence of 2,4-D was examined in 5 soils, bean and tomato plants serving as indicators. The chemical was applied at the rate of 10 lb. per acre, and toxicity disappeared in from 2 to 14 weeks, the bean being the more sensitive indicator. Factors found to reduce persistence included high soil temperature and high alkalinity, and also apparently high aerobic bacterial counts. No correlation was found between persistence and the organic matter content, fertility or adsorptive capacity of the soil.

2539. KING, L. J., LAMBRECH, J. A., AND FINN, T. P.
Herbicidal properties of sodium 2,4-dichlorophenoxyethyl sulfate.
Contr. Boyce Thompson Inst., 1950, 16: 191-208, bibl. 24, illus.

2,4-dichlorophenoxyethyl sulphate acts as a herbicide through the roots after contact with the soil and does not have any hormonal action on the foliage. Experiments were carried out in the laboratory and greenhouse and in the field. In the greenhouse it was shown that 1-10 lb. per acre disappeared from the soil in 12-30 days. Being equally injurious to weed and crop seedlings through the soil, the timing of applications is important. Experiments with sweet corn showed that effective control of weeds was obtained at the time of crop emergence and several days after germination of the weed seeds in the soil surface. The deeper root system of the crop was unaffected. Good weed control was also obtained in established plantings of asparagus. Tomatoes and cotton were sensitive to soil application, and injury may be due to the presence of shallow roots. The advantage of this type of herbicide over other hormone weedkillers is discussed. C.W.S.H.

2540. WILSON, J. R. W.
Field notes on use of the herbicide IPC.
Agric. Chems., 1951, 6: 2: 34-7, 91-7, bibl. 18, illus.

The selective properties of the grass-killing herbicide isopropyl N phenyl carbamate and its mode of application are discussed. Horticultural crops tolerant to the chemical include peas, safflower, bulbs, mint, strawberries and certain vegetables.

2541. STOECKELER, J. H.
Killing weed seeds.
Amer. Nurserym., 1951, 93: 8: 10.

In an experiment carried out on a tree nursery in Wisconsin, soil fumigation with methyl bromide gave complete freedom from weeds for at least 22 days. The stand of jack pines was about 56% higher at the end of the season in the treated beds than in the untreated ones, which suggests that methyl bromide has some fungicidal effect in addition to its weed control value.

2542. ZIMMERMAN, W. E.

New herbicides bring weed free turf closer.

Seed World, 1951, 68: 7: 17, 46, illus.

Potassium cyanate has been extensively tested in the United States and is considered a safe material to use against crabgrass, chickweed, goosegrass, purslane, lamb's quarters, pigweed and other obnoxious weeds in turf. It is economical and effective at 8 and 16 lb. per acre applied in 100 to 400 gal. of water with a wetting agent added to the spray mixture.

2543. GREEN, K. R.

T.C.A.—a promising new weedicide for grass control.

Agric. Gaz. N.S.W., 1950, 61: 455-6.

TCA is a contact, non-selective herbicide; on grasses its killing action is very slow and underground rhizomes may take 2 to 3 months to die. Its main use in New South Wales at present appears to be as a substitute for sodium chlorate for grass control. Its advantages over sodium chlorate are (1) the shorter period of soil sterilization, (2) reduced fire hazard, and (3) higher toxicity to plants. Its chief disadvantage is that its cost is at least twice that of sodium chlorate.

Apparatus.

2544. TERPSTRA, P., FRANSEN, J. J., AND KERSEN, M. C.

Proeven over bestrijdingstechniek met behulp van onkruidbestrijdingsmiddelen op groeistofbasis. (Experiments on spraying technique using hormone weedkillers.) [English summary $\frac{1}{2}$ p.]

Meded. Dir. Tuinb., 1950, 13: 805-12, illus.

The trials described compared the usual agricultural sprayer, delivering 70-90 gal. per acre, with a helicopter low volume sprayer (2.7 gal./acre) and a tractor-mounted atomizer (4.5-7.3 gal./acre), especially with regard to drift. The results showed that it is possible to get very good control of weeds with hormone weedkillers sprayed by low-volume equipment, and there are indications that the required amount of weedkiller might be lowered. The amount of spray fluid found outside the spraying track was relatively low and hardly any residue was observed 20 m. to leeward.

Particular weeds.

(See also 2570e.)

2545. FICHT, J. P.

Chemical control of annual weeds.

Proc. and Abstr. 4th west. Canad. Weed Control Conf., Saskatchewan, 1950, pp. 47-57.

The use of herbicides, particularly 2,4-D, is discussed in relation to farm practice in Canada, followed by

18 abstracts covering experiments on annual weed control in field crops and on fallow land.

2546. DUNCAN, D. A.

Chemical control of common perennial weeds.

Proc. and Abstr. 4th west. Canad. Weed Control Conf., Saskatchewan, 1950, pp. 57-64.

Notes and abstracts are given in which experiments on the control of the following weeds are described: sow-thistle (*Sonchus arvensis*), Canada thistle (*Cirsium arvense*), blue lettuce (*Lactuca pulchella*), white cockle (*Lychnis alba*), field horsetail (*Equisetum arvense*), and swamp persicaria (*Persicaria coccinea*).

2547. SEXSMITH, J. J.

Chemical control of persistent perennial weeds.

Proc. and Abstr. 4th west. Canad. Weed Control Conf., Saskatchewan, 1950, pp. 64-74.

From 14 abstracts, 2 articles and notes in 3 letters, summaries are presented by the author on the control of hoary cress (*Lepidium draba*), leafy spurge (*Euphorbia esula*), Russian knapweed (*Centaurea repens*), and toad flax (*Linaria vulgaris*). Little practical information was obtained, however, and new problems have arisen, such as the possibility of the existence of different morphological and physiological forms of hoary cress, noted for its varied reaction to 2,4-D.

2548. COUPLAND, R. T., AND ALEX, J. F.

Root studies of perennial weeds.

Proc. and Abstr. 4th west. Canad. Weed Control Conf., Saskatchewan, 1950, pp. 128-31, bibl. 12.

The eradication of persistent perennial weeds, such as leafy spurge, field bindweed, hoary cress and Russian knapweed, must depend on repeated removal of shoots in an attempt to starve the root system of stored food or upon killing the roots to a depth from which new shoots cannot reach the surface. To achieve this a thorough knowledge of the root systems of weeds is necessary. These vary not only between species but sometimes also within species. Some of the literature on the subject is reviewed.

2549. CARDER, A. C.

Chemical control of weedy grasses.

Proc. and Abstr. 4th west. Canad. Weed Control Conf., Saskatchewan, 1950, pp. 81-94.

Results from the numerous abstracts submitted show that no practical method has yet been discovered for the control of field scale infestations of couch or quack grass, *Agropyron repens*. TCA was the most promising chemical used, though Chlorosol-A, maleic hydrazide and possibly other materials warrant further investigation. Tillage, particularly before treatment, increased the effectiveness of TCA. Date of application did not seem very important, but moisture relations at the time of application appeared to be a most significant factor, possibly influencing the rates required. Pre-emergence TCA treatments offer promise for the selective control of wild oats, *Avena fatua*, in flax and further trials to control the oats with maleic hydrazide are suggested. Other weed grasses of lesser importance are mentioned.

2550. DE ROSE, H. R.

Crabgrass inhibition with O-isopropyl N-(3-chlorophenyl) carbamate.

Agron. J., 1951, 43: 139-42, bibl. 10, illus.

Experiments carried out at the Biological Department, Camp Detrick, Md, confirmed earlier results as to the value of aryl carbamates for the control of grasses. O-isopropyl N-(3-chlorophenyl) carbamate gave the most effective control of crabgrass (*Digitaria sanguinalis*), grown in pot trials with peas, soya beans, cotton, and strawberry plants. At rates of 0.5 and 1 mg. per lb. of soil the development of crabgrass was inhibited without any apparent effect on the crop plants. The latter were however affected by rates of 2 and 5 mg. O-isopropyl N-(3-chlorophenyl) carbamate showed greater stability and persistence in the soil than O-isopropyl N-phenyl carbamate.

2551. HAGSAND, E., AND ÅBERG, E.

The effect of 4K-2M and 2,4-D weed-killers on *Galeopsis* spp. and *Spergula arvensis* L.

Ann. roy. agric. Coll. Sweden, 1950, 17: 37-44, bibl. 4.

In several years' trials the herbicide 4K-2M (=methoxone) proved much more effective against *Galeopsis* spp. than did 2,4-D. A theory is put forward to account for the difference in response. In one experiment the reaction of *Spergula arvensis* to the two herbicides was found to be similar to that of *Galeopsis*.—Inst. of Plant Husbandry.

2552. ADIWINOTO, R. S.

Chemische onkruidbestrijding. (Chemical weed control.)

Bergcultures, 1950, 19: 187-93, illus.

Successful control of lalang grass was obtained on the Saroengan estate in Java by means of repeated sprays of 1% sodium arsenite during the dry season. As the grass was very high, tracks 2 m. apart were made to facilitate knapsack spraying and a preliminary sodium arsenite spray was applied to wither the grass. A week later the grass was burnt. Although weekly applications of the herbicide, subsequent to burning, eventually destroyed the lalang, it was found that weed seeds of other species, more resistant to sodium arsenite, germinated rapidly on the cleared ground. In order to clean the ground sufficiently well for the cultivation of derris, it was necessary to plough the land between every spraying, 4 sprayings and 3 ploughings being made in all, with a week between each operation. This method of control can also be used during the rainy season provided the spray applications are made when the grass is dry. The costs of labour and material and the manpower required are recorded.

2553. VAN SCHELTINGA, J. J. DE B.

Alang-alang bestrijding door bemesting. (Control of lalang grass by manuring.)

Bergcultures, 1950, 19: 213-15.

A dense cover of lalang grass in a neglected rubber plantation was replaced by a cover of other grasses and legumes as a result of shallow hoeing, planting *Albizia* trees in well-manured holes, and giving a light dressing of phosphate and ash. Where the same treatment was applied but without the top dressing, lalang grass was not controlled.

2554. REED, C. F.

Host distribution of mistletoe (*Phoradendron flavescens*) in Kentucky.

From abstr. in *Amer. J. Bot.*, 1950, 37: 666.

Mistletoe parasitizes 17 hosts in Kentucky. In the blue grass area the most common host is black walnut, while elsewhere it is sour gum. The distribution of mistletoe according to the host distribution is given with maps, showing the selection of hosts in a given area.

2555. PAINE, L. A.

The susceptibility of pear trees to penetration and toxic damage by mistletoe.

Phytopath. Z., 1950, 17: 305-27, bibl. 16, illus.

A study was made of the reaction of pear tree branches to inoculation with mistletoe seeds from pear and from other hosts. Susceptibility increased with successive yearly infections. Differences in varietal susceptibility were observed. The strains from the various hosts showed different degrees of toxicity to pear trees, the most toxic being from fir.—Institute of Botany, Zurich.

2556. MINSHALL, W. H.

Eradication of poison ivy (*Rhus radicans* L.).

V. The effect of foliage removal prior to treatment on the control of poison ivy by applications of ammonium sulfamate and 2,4-dichlorophenoxyacetic acid.

Sci. Agric., 1951, 31: 127-30, bibl. 5, illus., being *Contr. Div. Bot. Plant Path., Sci. Serv., Canada Dep. Agric.* 1044.

The removal of top growth of poison ivy in June had no significant effect on the control obtained by a July application of 10% ammonium sulphamate in Eastern Canada, but increased the efficiency of 0.1% 2,4-D. The benefit of foliage removal in the latter case was probably due to the increased activity of 2,4-D in the more recently expanded leaves.

2557. TAFURO, A., VAN GELUWE, J., AND CHRIST, E. G.

Two reports on poison ivy control. 2,4-D and 2,4,5-T.

Reprinted from *N.J. hort. News* in *Amer. Fruit Gr.*, 1951, 71: 4: 20-1, illus.

The technique of applying a mixture of 2,4-D and 2,4,5-T or ammonium sulphamate for the control of poison ivy in orchards is described.

2558. VALLANCE, K. B.

Studies on the germination of the seeds of *Striga hermonthica*. II. The effect of the stimulating solution on seed respiration.

J. exp. Bot., 1951, 2: 31-40, bibl. 11.

Aerobic respiration of seeds of *Striga hermonthica* was enhanced by a stimulating solution prepared by allowing roots of *Sorghum vulgare* seedlings to grow in distilled water. This effect was independent of germination. Anaerobic rate of CO₂ output of air-dry seeds was greatly increased by treatment with the solution, but seeds moisture-treated for 6 days were not so affected. There was no correlation between the effects of the stimulating solution on germination and respiration. [See also *H.A.*, 20: 241h.] C.W.S.H.

2559. VALLANCE, K. B.

Studies on the germination of the seeds of *Striga hermonthica*. III. On the nature of pretreatment and after-ripening.

Ann. Bot. Lond., 1951, 15: 109-28, bibl. 15.

An inverse relationship was found to exist between germination and respirational activity of immature *Striga hermonthica* seed during pre-treatment at 15° C. This suggests that germination depends on the accumulation of a metabolite. After-ripening of immature seeds changed the nature of the seeds so that peak respiration was at first progressively reduced. This might be due to a barrier restricting gaseous diffusion. The metabolite required for germination was considered to be proteinaceous, and the stimulating solution was thought to increase the permeability of the seeds to gaseous diffusion.—Hartley bot. Labs., Univ. Liverpool. C.W.S.H.

2560. VAAS, K. F.

Notes on the water hyacinth in Indonesia and its eradication by spraying with 2,4-D. [Javanese summary 5 pp.]

Contr. gen. agric. Res. Stat. Bogor 120, 1951, pp. 61, bibl. 51, illus.

An account is given of the damage done by *Eichhornia crassipes* in Indonesia and other tropical countries, based on the literature and on answers to a questionnaire. The biology and ecology of the plant are then described, special attention being paid to features that are important from the point of view of damage and eradication. A brief review of former methods of eradication is followed by a review of the use of growth substances and an account of experiments on control by 2,4-D. Water hyacinth was killed by concentrations of 2,4-D as low as 0.1%, the surface of the water being completely clear after 1 month. It was found that spraying when the leaves are wet or when the skies are cloudy should be avoided, but that the kill was not affected by rain falling more than $\frac{1}{2}$ hr. after spraying, provided conditions for assimilation and transport of the growth substance were favourable. Sufficient coverage of the leaves was of primary importance. Using a "saval" knapsack sprayer, optimum control was obtained with 1 g. herbicide per 1.5–2.0 m². Old, dense stands, rooted in the mud, were not killed as rapidly as young ones, but there was more risk of regeneration with floating than with rooted plants.

Weed control in vegetables, potatoes and flowers.

(See also 2570a, 3101, 3131.)

2561. ANDERSEN, E. T.

Weed control in horticultural crops.

Proc. and Abstr. 4th west. Canad. Weed Control Conf., Saskatchewan, 1950, pp. 94-101.

Results, reported in 8 abstracts on weed control in vegetables and strawberries, were as follows: *Oils*: Light oils (Stoddard Solvent, Varsol, Shellsol, etc.) have established themselves in many areas as standard selective herbicides for post-emergence applications to carrots and parsnips, and their use for other crops is being investigated. *2,4-D*: This chemical did not appear to be very suitable for selective weed control in vegetables in Western Canada. In general sweet corn,

asparagus and potatoes and to a lesser extent strawberries and raspberries have shown tolerance to the effects of 2,4-D. *Potassium cyanate*: Satisfactory control of wild mustard, stinkweed and wild buckwheat in onion beds was obtained by 16 lb. per acre and higher applications, without apparent injury to the onions, but in another trial injury to potatoes was reported from 8 and 16 lb. *Maleic hydrazide*: The diethanolamine salt of maleic hydrazide applied to well-established beets, chard, spinach, cucumbers, onions, peas, potatoes and tomatoes in 0.25 and 0.5% water solutions had various effects on the plants. *Other herbicides*: 5 lb. of TCA applied to potatoes increased their yield by 18% while the same amount reduced sunflower yields by 44%. Applications of 15 and 25 lb. caused marked reductions in both crops. Potatoes appeared to be quite resistant to ACP 646A, 649, and 638, but intolerant to IPC.

2562. ROBERTS, H. A., AND BLACKMAN, G. E.
Studies in selective weed control. III. The control of annual weeds in leguminous crops with 2:4-dinitro-6-secondary-butyl-phenol.
J. agric. Sci., 1950 (issued March 1951), 40: 263-74, bibl. 21.

From field data it is evident that there are wide variations in the concentration required to produce a standard kill. Susceptibility is greatest in the young seedling stage and resistance increases rapidly with age. It would appear that the use of dinitro-butyl-phenol or its ammonium salt could be extended to cover selective weed control in undersown cereals, cereal-legume mixtures and some of the more resistant legumes such as autumn-sown field beans. The ammonium salt is more toxic than the parent compound.—Oxford Univ.

2563. CARLSON, R. F., MOULTON, J. E., AND KRONE, P. R.
Further developments in weed control in gladiolus.
Quart. Bull. Mich. agric. Exp. Stat., 1951, 33: 269-74, bibl. 3, illus.

The following 4 herbicides gave 80% or better control of weeds in gladiolus plantings: 1 lb. of "TAT G-W", 4 lb. of EH 1, 2 lb. of 2,4-D and 6 lb. of "Premerge" per acre. No appreciable reduction in yield of corms resulted from any of the treatments.

Weed control in fruit crops.

(See also 3117, 3131.)

2564. HAVIS, J. R.

Chemical weed control in nurseries.

Amer. Nurseryman, 1951, 93: 5: 13.

Weed control in fruit and ornamental nurseries with 2,4-D, fuel oil, dinitro materials, IPC, TCA and 2,4,5-T is briefly discussed.

2565. CARLSON, R. F., AND MOULTON, J. E.
Further testing of herbicides in strawberry plantings.
Quart. Bull. Mich. agric. Exp. Stat., 1951, 33: 262-8, bibl. 9, illus.

Herbicides 2,4-D, EH 1, EH 2, IPC and EH 5722 were tested at 2 or 3 rates on strawberry plots infested with *Amaranthus retroflexus*, *Ambrosia elatior* and *Bromus*

tectorum. 2,4-D at the rate of 2 lb. per acre proved to be the most effective, but caused a marked reduction in runner production, while EH 1 at 6 lb. per acre was almost as effective without depressing runner production.

2566. SHAULIS, N. J.

A progress report on the use of fortified oil emulsions in weeding grapes.

Proc. Amer. Soc. hort. Sci., 1950, **56**: 203-9, bibl. 2, illus., being *J. Pap. N. Y. St. agric. Exp. Stat.* 827.

In trials covering 4 years at Geneva, N.Y., Concord grape vines grew and yielded equally well when the inter-row spaces were disced and the rows themselves were sprayed with oil emulsions fortified with dinitro-*o*-secondary butyl phenol or dinitro-*o*-cyclohexylphenol as when the inter-row spaces were disced and the rows hoed. In the first two years 3 applications per year were made; in the second two years 2 applications were sufficient. Earlier trials showed that Concord grapes are easily injured by 2,4-D and by sodium TCA. The type of spraying boom used is illustrated.

Weed control in tung.

2567. SITTON, B. G., AND OTHERS.

Preemergence treatment for weed control in the tung nursery.

Proc. Amer. Soc. hort. Sci., 1950, **56**: 197-202.

In trials in Mississippi and Florida seed of 2 tung varieties was sown after being stored dry, stratified or cold-stored in moist wood shavings at 45° F. There was little difference in percentage germination, but the cold-stored seed, being sown later in warm soil, germinated more quickly. Of 5 different herbicides in 18 different treatments applied to the nursery beds DNP, diesel oil, 2,4-D and some combinations of herbicides gave entirely satisfactory weed control without hand hoeing. The stand of trees was reduced slightly in some cases, but this could readily be offset by sowing the seed a little thicker. It is concluded that pre-sowing cold-storage treatment of tung seed to hasten emergence followed by the use of herbicides in the nursery gives promise of greatly reducing the cost of raising trees.

Control of undesirable trees and shrubs.

2568. PLAYFAIR, L.

Chemical control of woody brush.

Proc. and Abstr. 4th west. Canad. Weed Control Conf., Saskatchewan, 1950, pp. 75-80.

From the 4 abstracts received it appears that: the ester of 2,4-D is ineffective against wild rose; the substitution of 5 gal. of oil per acre is no more effective than 10 to 20 gal. of water; when mixed lots of plants

to be treated include 2,4-D-resistant species the use of a mixture of 2,4-D and 2,4,5-T is advisable; and for the commercial treatment of brush a minimum of 1½ lb. acid per acre seems essential. Apparatus used for roadside spraying is discussed.

2569. HAMMAR, H. E.

Killing Chinese chestnut stumps with 2,4-D.

Proc. 40th annu. Mtg north. Nut Grs' Ass. 1949, Beltsville, Md, 1950, pp. 116-20, bibl. 4.

Stumps of 11-year-old dormant seedling Chinese chestnut trees were successfully killed in Georgia by painting the cut surface with an aqueous solution of 12% 2,4-D or with a concentrated solution of ammate (ammonium sulphamate).

Noted.

2570.

a ALTONA, R. E., AND MENTZ, N. J.

The control of weeds in maize with selective plant-growth regulators. Second report 1949-50 season.

Emp. J. exp. Agric., 1951, **19**: 26-32, bibl. 8.

b ANON.

Herbicide damage to shade trees.

Agric. Chemls., 1951, **6**: 3: 42-3, 122-5, illus. How to diagnose and to avoid 2,4-D injury to trees.

c CRAIG, H. A.

Federal-provincial weed surveys in western Canada.

Proc. and Abstr. 4th west. Canad. Weed Control Conf., Saskatchewan, 1950, pp. 144-8.

d FRIESEN, H. A.

Tillage and cropping methods for weed control.

Proc. and Abstr. 4th west. Canad. Weed Control Conf., Saskatchewan, 1950, pp. 131-40, bibl. 1. Includes 5 abstracts.

e OCFEMIA, G. O., AND JAVIER, S. V., Jr.

Experimental control of water hyacinth in lowland rice fields with herbicides.

Philipp. Agric., 1950, **33**: 285-7, bibl. 1, illus. Five proprietary herbicides killed water hyacinth.

f PAVLYCHENKO, T. K.

Development of new herbicides.

Proc. and Abstr. 4th west. Canad. Weed Control Conf., Saskatchewan, 1950, pp. 114-17.

VEGETABLES, TEMPERATE, TROPICAL AND GLASSHOUSE.

General.

(See also 2373, 2421, 3111, 3116, 3127, 3131.)

2571. VAN KOOT, Y.

De betekenis van het fysiologisch onderzoek voor de teelt van tuinbouwgewassen onder glas. (The importance of physiological research to the culture of plants under glass.) [English summary 13 lines.] *Meded. Dir. Tuinb.*, 1950, 13: 629-38, bibl. 19.

The development of applied plant physiological research is outlined and emphasis laid on the effect of external conditions on growth, periodicity in development, and fruiting. Tomato is taken as an example.

2572. PORTERFIELD, W. M., Jr.

The principal Chinese vegetable foods and food plants of Chinatown markets.

Econ. Bot., 1951, 5: 3-37, bibl. 72, illus.

Not only vegetables but the whole range of plant foods bought and consumed by the Chinese in New York are described in this article. In general the vegetables are the same as those to be found in greater variety in China and South-east Asia. Rice and pulses and all the tropical and sub-tropical roots are mentioned and interesting information is given on the preparation and uses of each. Fruits described include the litchi, *Zizyphus sativa*, *Canarium* species and the horned chestnut (*Trapa bicornis*). C.W.S.H.

2573. WIEBOSCH, W. A.

Het veranderen van de vernalisatietoestand als hulpmiddel bij de plantenveredeling. (Changing the degree of vernalization as an aid to plant breeding.) [English summary $\frac{1}{2}$ p.]

Meded. Dir. Tuinb., 1950, 13: 593-607, bibl. 14, illus.

Changing the degree of vernalization can (1) advance the time of flowering and improve seeding, (2) prevent flowering or reverse the reproductive condition. The degree of vernalization can be changed by the sowing time and by cold vernalization. The effect upon growth and development under various day lengths is discussed. In endive the effect is most pronounced if the young plants are exposed to a long-day or continuous illumination. Devernalization by high temperature and taking cuttings from certain parts of a plant, is also mentioned.

2574. BANGA, O.

De veredeling van kruisbestuivende groentegewassen. (Improving cross-pollinated vegetables.)

Reprinted from *Erfelijkheid in 'Praktijk*, 1951, 12, No. 1, pp. 7.

A summary is given of results obtained in work aimed at producing good and cheap seed for the market, discussed under old methods, new methods, the technique for the selection of A1 seed, and the production of A1 seed for industry.

2575. JACKS, H.

The efficiency of chemical treatments of vegetable seeds against seed-borne and soil-borne organisms.

Ann. appl. Biol., 1951, 38: 135-68, bibl. 51.

Of the 34 newer fungicides tested in greenhouse and field trials, red cuprous oxide (Cuprocide), tetrachloro-parabenzoquinone (Spergon), methyl mercury dicyandiamide (Panogen), tetramethylthiuram disulphide (T.M.T.D.), ferric dimethyldithiocarbamate (F.D.D.), zinc trichlorophenate (Dow 7B) and 1-*p*-sulphamyl-phenyl-3:5-dimethyl-4-nitrosopyrazole (36 L) were selected for detailed investigation on lettuce, pea, french bean, turnip, red beet, tomato and celery. Derivatives of dithiocarbamic acid, and 36 L and Spergon, among non-metallic compounds, compared favourably with cuprous oxide and organomercurial compounds. Surface disinfection of seed by Spergon and Panogen compared favourably with acidulated mercuric chloride. T.M.T.D., 36 L and Spergon were the most efficient in controlling pre-emergence damping-off. Treated seed stored dry for 10 months gave better emergence than untreated seed, and showed no evidence of diminished germination. [From author's summary.]—*Imp. Coll. Sci. Technol.*, London.

2576. ANON.

The warm water treatment: a means of freeing plants from certain diseases.

Agric. Gaz. N.S.W., 1950, 61: 645-6, illus.

The temperatures and duration of treatments for a number of vegetable seeds, and for chrysanthemum crowns and daffodil bulbs are given.

2577. PORTER, R. H.

Treatment of crop seeds in Brazil and Paraguay.

Phytopathology, 1951, 41: 367-74, bibl. 3.

The seeds treated included those of beans, garden beet, and peas. Good results were obtained by dusting with Arasan, Phygon, Granosan, Ceresan, and Semesan Jr.

2578. LUTOHN, S. N.

The union by approach grafting of annual plants of different families. [Russian.]

Priroda, 1950, 39: 10: 56-8, illus.

Successful unions are reported between *Amaranthus albus* and *Chenopodium album*, *Chenopodium album* and *Cucurbita pepo*, and *Amaranthus albus* and *Citrullus colocynthoides*.

2579. BROWNE, F. S.

Organic soil management for vegetables.

Publ. Canada Dep. Agric. 853, 1950, pp. 36, illus.

In this account of the fertilizer recommendations for organic soils in Quebec and Eastern Ontario the following points are discussed: origin and classification; fertilizer requirements of organic soils; minor element requirements of organic soils; water control; soil management. A summary is given of the fertilizer recommendations, with formulae and rates per acre for 25 vegetables.

2580. BAUR, K., AND TREMBLAY, F. T.

Band the fertilizer for best results with row crops in Western Washington.

Bett. Crops, 1950, 34: 8: 17-20, 42-3, illus.

When phosphate fertilizers are broadcast a high proportion becomes unavailable to the crops. Experiments with beans, beet, broccoli, cauliflower, cucumbers, peas, spinach, sweet corn and potatoes have

shown that increases in yield are obtained by applying the fertilizers in bands at sowing time instead of broadcasting. Band application has also assisted weed control and hastened the maturity of sweet corn. Experiments have shown that the best position for the band varies with the crop. A table of suggested positions for each crop is given. C.W.S.H.

2581. LEONARD, C. D., AND BEAR, F. E.
Sodium as a fertilizer for New Jersey soils.
Bull. N.J. agric. Exp. Stat. 752, 1950,
pp. 24, bibl. 21, illus.

Data obtained show a favourable effect on growth from applying Na fertilizers to a number of vegetables, and indicate that, on soils which are low in available K, the use of Na fertilizers may be advantageous for sugar beet, Swiss chard, celery and spinach, and possibly for tomatoes.

2582. TIEDJENS, V. A.
Aluminum foil mulch.
Brooklyn bot. Gdn Rec., 1950, 6: 198-200,
illus. (condensed from *Flower Grower*, July, 1950).

Experiments using strips of aluminum foil as mulch for garden plants in coastal Virginia have shown remarkable yield increases in beets, broccoli, cantaloupe, carrots, celery, cucumbers, lettuce, sweet corn, sweet pepper, sweet potatoes, and tomatoes. The beneficial effects of this form of mulch on soil temperature, moisture and structure and on weed suppression are indicated.

2583. MILLER, P. R., AND O'BRIEN, M.
The plant disease warning service in 1950.
Plant Dis. Repr., 1950, *Suppl.* 197, pp.
559-72.

Reports are given, with maps, on four diseases which were prevalent in 1950, viz. tomato and potato blight (*Phytophthora infestans*), tobacco blue mould (*Peronospora tabacina*), and cucurbit downy mildew (*Pseudoperonospora cubensis*).

2584. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.
Insect pests.
Agric. Gaz. N.S.W., 1950, 61: 469-73, 522-6, 583-6, 641-4, illus.

These notes include descriptions with control measures of springtails (*Collembola*), the leaf-blister sawfly of eucalyptus (*Phylacteophaga eucalypti*) and carrot-aphids (Aphididae), the Queensland fruit fly (*Dacus (*Strumeta*) tryoni*), seedling maggot (*Hylemyia* sp.), and the seedling bean midge (Chironomidae), the fruit-tree moth borer (*Moraga unipunctata*), the leaf-eating ladybird (*Epilachna 28-punctata*), the bean weevil (*Bruchus obtectus*), the tomato caterpillar (*Heliothis armigera*), and the tomato mite (*Vasates destructor*).

2585. MORGAN, W. L.
Control of insect pests of canning vegetable crops in the central-western slopes districts.
Agric. Gaz. N.S.W., 1950, 61: 636-40.

Notes are given on the damage caused by, and control of, the vegetable weevil on tomato seedlings, green leafhoppers, red-legged earth mite, cutworms, ruther-

glen bug, tomato mite and fruit caterpillar, green vegetable bug on tomato, red-legged earth mites on peas, blind-eye bug of stringless beans, celery aphids, cabbage moth and white butterfly, grey cabbage aphid, onion thrips, red-legged earth mite damage in beetroot, 28-spot ladybird on pumpkins and melons, and pumpkin beetle.

2586. KENNEDY, J. S., AND BOOTH, C. O.
Host alternation in *Aphis fabae* Scop. I.
Feeding preferences and fecundity in relation to the age and kind of leaves.
Ann. appl. Biol., 1951, 38: 25-64, bibl. 22.

The feeding preferences and comparative fecundity of laboratory-bred, alienicolae alatae of *Aphis fabae*, the bean aphid, were investigated in small leaf cages on spindle and sugar beet leaves, representing a winter and a summer host respectively, both in pots in the greenhouse and while growing naturally outdoors. The habits of the aphids under these conditions are described. The findings form the basis of a dual discrimination theory of host selection, which assumes that aphids respond behaviourally to at least two main classes of leaf property, one associated with the age of the leaf and the other with the kind of plant. Host alternation is considered in the light of the dual discrimination theory, as a particular instance of a shifting distribution-pattern probably connected with the alternation of the seasons of active growth and senescence in the winter and summer host plants.—*Zool. Dep.*, Cambridge.

2587. SCHREIER, O.
Die Kellerlaus (*Myzodes latysiphon* Dav.) eine neue Blattlausart in Österreich. (The cellar aphid (*Myzodes latysiphon*) a new leaf aphid in Austria.) [English summary ½ p.]
PflSch. Ber. Wien, 1950, 5: 377-85, bibl. 9, illus.

Myzodes latysiphon is reported for the first time as feeding on 13 species of vegetables including potatoes. E 605 and BHC were not found effective for control, but a parasite, *Porcellio scaber*, seems capable of providing satisfactory biological control.

2588. WATZL, O.
Zur Lebensweise und Bekämpfung der Wintersaateule (*Agrotis segetum* Schiff.). (The cutworm and its control.) [English summary ½ p.]
PflSch. Ber. Wien, 1950, 5: 345-58, bibl. 15.

The comparative efficiency of trapping cutworm moths by light and baits was investigated. Neither method gave effective control.

2589. MINISTRY OF AGRICULTURE, LONDON.
Flea beetles.
Adv. Leaflet. Minist. Agric. Lond. 109, 1950,
pp. 4, illus., 1d.

A short general account of flea beetles with illustrations of the lesser striped flea beetle (*Phyllotreta undulata* Kuts.) and the mangold flea beetle (*Chaetocnema concinna* Marsh.) is given, with recommendations for control with DDT, BHC, derris or lonchocarpus dust, and nicotine.

2590. READ, W. H., AND WAIN, R. L.
The ovicidal activity of some phenyltrichloromethylcarbinols and their esters towards eggs of the glasshouse red spider mite (*Tetranychus telarius* L.).
J. Sci. Food Agric., 1951, 2: 204-7, bibl. 14.
In studies at Cheshunt Research Station and Wye College 4-chlorophenyltrichloromethylcarbinol and its acetate were the only compounds showing appreciable ovicidal action, but the following relations between ovicidal activity and chemical constitution were indicated by the results: (a) toxicities of phenyltrichloromethylcarbinol and its esters were increased by the introduction of Cl—and, to a lesser degree, of CH₃—into the *para*-position of the ring; (b) the ovicidal activity of the carbinols was reduced by esterification; (c) the 4-chlorobenzoates appeared to be more toxic than the corresponding 4-nitrobenzoates, but less toxic than the acetates.

2591. SMITH, F. F., FULTON, R. A., AND HALL, S. A.
Toxicity of organic phosphates to the two-spotted spider mite and the foxglove aphid.
J. econ. Ent., 1950, 43: 627-32, bibl. 6.
Aerosols containing hexaethyl tetraphosphate, tetraethyl pyrophosphate, or tetraethyl dithiopyrophosphate in methyl chloride, applied at low dosages, were more toxic in greenhouse trials to the two-spotted spider mite, *Tetranychus bimaculatus*, than to foxglove aphids, *Myzus convolvuli*, and were non-toxic to greenhouse whiteflies, *Aleurodes proletella*, and to citrus mealybugs, *Pseudococcus citri*. At the dosages recommended for commercial greenhouses, they were toxic to all four species. Tetraethyl pyrophosphate gave the highest kill of aphids and mites in the first 15 minutes, but tetraethyl dithiopyrophosphate killed the spider mites faster and remained toxic longer.—U.S. Dep. Agric.

2592. WENE, G. P., AND OTEY, G.
Control of red spider mites on vegetables.
Proc. 5th annu. Rio Grande Valley hort. Inst., 1951, pp. 16-19, bibl. 4.
In trials on celery, eggplants and cucumbers in Texas in the 1949-50 vegetable season 1% parathion, 1% Karothane and 10% R-242 gave good control of red spider mites, *Septanychus texazona* McGregor, the two last having the best residual effect. Aramite also showed promise, but TEPP, while controlling mites immediately after application, had little or no residual effect during warm weather. Sulphur dusting had little effect.

2593. NEISWANDER, C. R., RODRIGUEZ, J. G., AND NEISWANDER, R. B.
Natural and induced variations in two-spotted spider mite populations.
J. econ. Ent., 1950, 43: 633-6, bibl. 2.
Investigations at the Ohio Agricultural Experiment Station established wide variations in populations of two-spotted spider mites, *Tetranychus bimaculatus*. Rate of development and ease of control was influenced by the host plant. Roses induced greater resistance than beans, and beans than tomatoes. Two to three generations are required to complete characteristics changes after transfer to a different host.

2594. SMITH, F. F., AND CLIFFORD, P. A.
Translocation of parathion from foliage applications.
J. econ. Ent., 1950, 43: 708-12, bibl. 3.
In greenhouse tests parathion at 2 lb. of 25% wettable powder per 100 gal. was applied to the foliage of 12 vegetables with their edible portions protected. Analyses showed no parathion in shelled lima beans or tomatoes; under 0.01 p.p.m. in cucumber, pepper, and radish; 0.04 and 0.01 p.p.m. in snap beans and beets; and 0.13 to 0.34 p.p.m. in cabbage, Chinese cabbage, Swiss chard, collards, and kale. Field trials gave confirmatory results. Strawberries treated when in bloom or with young fruit showed 0.02 p.p.m. in mature fruits compared with 0.23 p.p.m. where parathion had been applied only 8 days before harvest.

Asparagus.

2595. KIDNER, A. W.
The breeding and cultivation of asparagus.
J. roy. hort. Soc., 1951, 76: 134-8, illus.
The author describes how, by pedigree breeding, he has produced a strain of high quality asparagus of which 90% can be graded above the $\frac{1}{2}$ in. diameter standard, and 6% are over 1 in. in diameter. In the last 2 generations no sprue has appeared. If a crown has a good pedigree, it can be planted out at 1 year old; this results in less damage to the roots than the normal practice of planting at 3 years old. The importance of wide spacing is stressed, single rows 4-5 feet apart being recommended. If pedigree crowns are planted with adequate spacing, further cultural treatment is very simple.

2596. ARMAND, J. E.
Asparagus beetles.
Processed Publ. Canada Dep. Agric. Div. Ent. 103, 1951, pp. 4.
Recommendations for the control of *Crioceris asparagi* and *C. duodecimpunctata* are removal of volunteer plants, close cutting, and dusting or spraying with rotenone preparations.

Brassicas.

(See also 2222, 2244, 2251, 2257, 2689, 2708d, q, y.)

2597. MUSIL, A. F.
Identification of brassicas by seedling growth or later vegetative stages.
Circ. U.S. Dep. Agric. 857, 1950, pp. 26, illus.

A key for the identification of brassica seedlings (14-day plants), and descriptions of the various kinds, 28 in all, are given.

2598. BRUNE, W.
Observações sobre compatibilidade no gênero *Brassica*. (Compatibility in the genus *Brassica*.) [English summary $\frac{1}{2}$ p.]
Rev. Ceres, 1949, 8: 158-72, bibl. 18 [received 1951].

Several species and varieties of *Brassica* were interbred, for a study of their phylogenetic relationship. The index "seed: ovules" was adopted for evaluating their compatibility. The fertility of the hybrids was compared with that of the parents. It was concluded that

B. chinensis, *P. pekinensis*, and *B. rapa* seem to belong to the same taxonomic group and *B. japonica* to another.

2599. VITTM, M. T., AND FOSTER, R. E.

Effect of soil fertility level on the performance of eight strains of Danish ballhead cabbage.

Proc. Amer. Soc. hort. Sci., 1950, 56: 257-60.

In a trial on a loam soil at Barker, N.Y., there were no significant interactions between 8 strains of Danish Ballhead cabbage and fertility levels for yield, average weight per head, or number of heads per acre. With a basic dressing of 10 tons manure plus 333 lb. 20% superphosphate per acre, additional applications of 500, 1,000 and 2,000 lb. of 5-10-10 fertilizer per acre considerably increased yield, the number of marketable heads and the average weight per head. The soil proved to be yellow- (fusarium-) infested and resistant strains significantly outyielded susceptible strains.

2600. PLANT, W.

The control of "whiptail" in broccoli and cauliflower.

J. hort. Sci., 1951, 26: 109-17, bibl. 10, illus.

The visual symptoms of molybdenum deficiency (whiptail) in broccoli and cauliflowers vary widely. All the varieties of broccoli and cauliflower observed during the trials described appear to be susceptible to whiptail. Diseased plants contained 0.02 to 0.08 p.p.m. molybdenum, while healthy plants contained 0.12 to 6.00 p.p.m. In two experiments with broccoli, gypsum lowered the molybdenum content of the plants. Whiptail was prevented by applying molybdates at 2 to 4 lb. per acre, and ground limestone at rates which raised the soil pH to neutrality. The practical correction for whiptail is usually liming. [See also *H.A.*, 20: 1637.]—Long Ashton Res. Stat.

Celery.

(See also 2269, 2575, 2581, 2592, 2708t.)

2601. WITTWER, S. H., REATH, A. N., AND DAVIS, J. F.

Pascal celery varieties in Michigan.

Quart. Bull. Mich. agric. Exp. Stat., 1951, 33: 242-8, bibl. 2, illus.

In continuation of earlier trials [see *H.A.*, 20: 1656 and 21: 1630] it was confirmed that for varieties of Pascal celery 4 to 6 inch spacing in 32-inch rows is most satisfactory under Michigan conditions. Yields are tabulated for a number of summer and late Utah type varieties of celery.

Cucurbits.

(See also 2592, 2688, 2708h, i, o, v, x, z, 2709a, b.)

2602. MITCHELL, C. E., AND HUELSEN, W. A.

Growing melons in Illinois.

Circ. Ill. agric. Ext. Serv. 675, 1950, pp. 27, illus.

While the extensive production of melons for shipping is not likely to be developed in Illinois, due to the somewhat unfavourable climate and lack of irrigation facilities, there is a place on the local market for melons that have been picked ripe and have not had to undergo

transport. Directions are given for the planting, care, picking and marketing of muskmelons and watermelons, together with notes on varieties and pest and disease control. Cultural practices are much the same for both types of melon, although picking and marketing practices differ.

2603. DE STIGTER, H. C. M.

The influence of stock foliage in an incompatible cucurbitaceous graft.

Reprinted from *Proc. Kon. ned. Akad. Wetensch.*, 1951, 54C: 58-65, bibl. 1, illus., as *Publ. Lab. TuinbPIteelt, Wageningen* 95.

Cucumbers have for some years been grafted onto *Cucurbita ficifolia* stock to prevent attack by *Fusarium* fungus. The muskmelon, however, was found to be incompatible with *C. ficifolia*, unless some leaves were left on the latter stock. With 8 leaves left on, a healthy plant and reasonable crop could be expected. From trials with varying numbers of leaves, and from the results of double grafting with *C. ficifolia* and cucumber plants with and without leaves, it was concluded that the ability of the muskmelon to keep alive only when *C. ficifolia* has its own leaves is due to the production of a specific substance with a physiological function. C.W.S.H.

2604. MANN, L. K., AND ROBINSON, J.

Fertilization, seed development, and fruit growth as related to fruit set in the cantaloupe *Cucumis melo* L.).

Amer. J. Bot., 1950, 37: 685-97, bibl. 38.

The factors responsible for a drop of pollinated flowers in the powdery mildew resistant cantaloupe No. 45 were studied at Davis, California. Relying solely on insect pollination it was found that, whereas only 10% of perfect flowers set fruit on unthinned vines, on thinned vines 60 to 70% of the flowers set. Fruit drop usually occurred soon after anthesis, the first evidence being cessation of ovary growth. There was no evidence that fruit drop was induced by discontinuation of embryo sac development, pollen tube growth or seed development. Abscission, always occurring several days after the ovary ceased to elongate, appeared to play a secondary role. Many perfect flowers dropped in the bud stage, and in unthinned vines only about one-quarter of the total buds reached anthesis before dropping. While growing fruit exerted a considerable effect on the set of additional fruit, the control mechanism was not ascertained. Available data on insect vs. hand pollination indicate some inadequacy in the technique of hand pollination.

2605. MOZAWA, R.

Studies on the fruiting of squash. [Japanese with English summary ½ p.]

J. hort. Ass. Japan, 1950, 19: 157-60.

In plants pinched immediately above the fruit both fresh and dry weight of the fruits was less than on other plants in the trial. No marked difference in number of seeds per fruit was found in pinched plants and plants not pinched.

2606. AYCOCK, R.

Investigations on a mosaic of cantaloupe in South Carolina.

From abstr. in *Phytopathology*, 1951, 41: 2.

A cantaloupe mosaic caused by an unidentified virus occurs extensively in South Carolina, symptoms including vein-clearing, vein-banding and mottle. It can be readily transmitted to cucumber, squash and watermelon, but only on the first of these and on cantaloupe has it so far been observed in the field.

2607. ZINK, F. W., AND DAVIS, G. N.
Cantaloupe mosaic as affected by nitrogen fertilization.

Plant Dis. Repr., 1950, 34: 371-3.

The results obtained substantiate the findings of the previous season that the severity of mosaic infection of cantaloupe plants, as reflected in yield of marketable fruit, is not alleviated by heavy applications of nitrogen during the growing season.—Univ. Calif.

2608. CASTELLANI, E.
Su un marcume radicale delle zucche.
(A root rot of vegetable marrow.) [English summary 8 lines.]
Riv. Ortoflorofruttic. ital., 1950, 34: 134-6, bibl. 6, illus.

Vegetable marrows growing in hotbeds near Florence remained stunted; many secondary roots had rotted and the tap-root showed brown lesions caused by *Thielaviopsis basicola*. Soil sterilization is recommended.

2609. ARMAND, J. E.
The squash bug.
Processed Publ. Canada Dep. Agric., Div. Ent. 102, 1951, pp. 4.

The squash bug, *Anasa tristis*, is primarily a pest of squash and pumpkins, but may attack other cucurbits. It is controlled by (1) cleaning-up and burning all crop remnants in the autumn, (2) thorough cultivation, and proper use of fertilizers, (3) hand-picking egg clusters, (4) placing shingles on the ground in the evening and next day destroying the insects hidden beneath, (5) the application of nicotine sulphate or sabadilla. DDT, though effective, may injure some cucurbits.

2610. MERRILL, L. G., Jr.
Injury to squash, field pumpkin and cucumber plants resulting from application of insecticides.
Quart. Bull. Mich. agric. Exp. Stat., 1951, 33: 211-17, bibl. 1, illus.

1% parathion, 5% chlordane, 3% DDT, 5% compound 1189, 2½% aldrin, 5% dilan and 1½% dieldrin all caused injury to one or more of the varieties treated, Blue Hubbard squash appearing to be the least affected. 1% lindane, 5% methoxychlor, CPR and 10% zerlate, however, did not damage any of the plants. The addition of charcoal to parathion did not prevent injury.

2611. BOEKENOOGEN, H. A.
The carotene content of the fruit of *Momordica cochinchinensis* Spreng.
Philipp. J. Sci., 1949, 78: 299-300.

The deep red layer of pulp surrounding the seeds in the fruit of *M. cochinchinensis* was found to contain only a small quantity of carotene.

Legumes.

(See also 2216, 2217, 2220, 2221, 2224, 2225, 2234-8, 2241, 2245-50, 2255, 2257, 2562, 2575, 2577, 2586, 2689, 2708c, e, j, l, m, 2709c.)

2612. WELLS, D. G.
Inheritance and linkage relations of a crinkled variant in peas.
J. Genet., 1951, 50: 230-4, bibl. 7, illus.

Rogue-type plants, showing a crinkled, mosaic-like condition, are very common in seedling stands of field and canning peas. Results of investigations carried out at the Wisconsin Experiment Station suggest that the crinkled variant is the result of a simple mutant of high frequency and that its inheritance differs from normal by a single factor. Plants are affected only in the seedling stage, the crinkled character being more strongly developed at low than at high temperatures. Although the growth of affected seedlings is retarded, plants ultimately assume normal growth.

2613. VERHEY, C.
Onderzoekingen betreffende het kiemen van bonen. (Determining the germinative capacity of beans.) [English summary 6 lines.]
Meded. Dir. Tuinb., 1950, 13: 829-36.

The "rolled towel test" was compared with the Wageningen germination method in beds. With equal quantities of water the results were the same.

2614. DEZEEUW, D. J., AND ANDERSEN, A. L.
Response of pea varieties to dry and slurry methods of seed treatment.
From abstr. in *Phytopathology*, 1951, 41: 10.

The response of pea varieties to Ceresan M (7.7% ethyl mercury p-toluene sulphonanilide) varied with the method of applying the fungicide to the seed. Dry applications of 4 oz. per 100 lb. of seed resulted in significant stand increases, whereas stands of many varieties were reduced significantly with the same rate of application of the fungicide in a water slurry. Plants from seeds injured by the water slurry were stunted, lacked secondary roots and had shortened and browned radicles—all typical symptoms of mercurial poisoning.

2615. DORMER, K. J., AND PLACK, R. L.
A quantitative study of shoot development in *Vicia faba*. II. The elongation of internode and petiole.*
Ann. Bot. Lond., 1951, 15: 157-73, bibl. 5.

The elongation of the internodes and petioles of *Vicia faba* has been studied in the plumules of normal seedlings, in seedlings from which part or all of the cotyledonary reserve has been removed, and in axillary shoots developed on seedlings of various ages. The effects of age and of removal of cotyledonary reserves are described, and it is concluded that it is unlikely that the characteristic differences in internode length within the limits of a single shoot are wholly due to changes in the availability of reserve substances. [From authors' abstract.]—University of Manchester.

* For part I, see *H.A.*, 20: 2214.

2616. FORSEE, W. T., JR., AND HOFFMAN, J. C.
The phosphate and potash requirements of
snap beans on the organic soils of the Florida
everglades.
Proc. Amer. Soc. hort. Sci., 1950, **56**:
261-5. bibl. 7.

Yield and soil test data are presented from which it is concluded that the optimum levels for snap beans are: pH 5.50 to 6.00; water soluble phosphorus 6.0 to 7.0 lb. per acre; 0.5 N acetic acid soluble potassium 75 to 100 lb. per acre. Fertilizer recommendations are made, based on these data and on experience of commercial practice.

2617. MATTSON, S., AND OTHERS.
Factors determining the composition and
cookability of peas.
Acta Agric. Scand., 1950, 1: 40-61, bibl. 6.

Peas grown on a soil having a high content of available phosphate will possess a high phytin content and will, if fully ripe, be easy to cook. [From authors' summary.]-Royal Agricultural College of Sweden, Uppsala.

2618. VIETS, F. G., Jr.
Zinc deficiency of corn and beans on newly
irrigated soils in central Washington.
Agron. J., 1951, **43**: 150-1, illus.

Foliar applications of zinc sulphate corrected chlorosis and stunted growth, which became particularly acute where the top soil was removed in levelling land for irrigation.

2619. BRIDGMON, G. H.
Relation of southern bean mosaic to black
root.
From abstr. in *Phytopathology*, 1951, **41**: 5.

From inoculation studies described it is concluded that the original description of black root may have referred in part to systemic necrosis induced by the southern bean-mosaic virus.

2620. JACOBS, S. E., AND MOHANTY, U.
Studies in bacteriosis, XXVII. Factors
influencing infection by *Corynebacterium*
fascians (Tilford) Dowson.
Ann. appl. Biol., 1951, **38**: 237-45, bibl. 6,
illus.

Laboratory experiments showed that gram (*Cicer arietinum*) could be infected by *Corynebacterium fascians*, the organism that causes leafy-galls and fasciation of various plants and "cauliflower" disease of strawberry. Parallel tests on sweet peas and gram confirmed the existence of host specificity among strains of the pathogen, and of differences in host susceptibility towards a given strain.—Imp. Coll. Sci. Technol., London.

2621. ANDERSEN, A. L.
Bacterial disease of Michigan navy pea beans.
Quart. Bull. Mich. agric. Exp. Stat., 1951,
33: 199-200, bibl. 1, being *Contr. Dep. Bot.*
Plant Path. Mich. St. Coll. 51-1.

Xanthomonas phaseoli var. *fuscans* was shown to be responsible for 75% of the blight found on navy pea beans in a series of isolations carried out in 1949.

2622. WILSON, R. D.
Anthracnose of French beans.
Agric. Gaz. N.S.W., 1950, 61: 647-50, illus.

Recent investigations have shown that there are at least two strains of the anthracnose fungus (*Colletotrichum lindemuthianum*) in New South Wales. Varieties susceptible to both strains are mentioned. Commercial lines of the variety Brown Beauty contain mixtures of strain 1-resistant and strain 1-susceptible types, but all Brown Beauty plants so far tested have been found susceptible to strain 2. The varieties Refugee No. 5, Idaho Refugee and Logan were tolerant (moderately resistant) to both strain 1 and strain 2. Control measures are discussed. Spraying or dusting the plants with a fungicide is not recommended except in special cases.

2623. YARWOOD, C. E., AND COHEN, M.
Hypertrophy from the uredial stage of bean
rust.
Bot. Gaz., 1951, **112**: 294-300, bibl. 8, illus.

Hypertrophy on *Phaseolus vulgaris* var. Pinto induced by inoculation with *Uromyces phaseoli typica* during the uredial stage was manifested (a) by concavities or convexities in the areas of localized inoculations on primary leaves, (b) by visible increases in the growth of infected primary leaves, and (c) by measurable increases in total growth of leaves when whole plants were inoculated. With (b) the increase was most pronounced in the later stages, while with (c) it was manifest 12 hours after inoculation. In both cases hypertrophy occurred only with 200 or less inoculations per cm² of leaf area, more than this reducing leaf growth.—University of California, Berkeley.

2624. OOSTENBRINK, M.
Het erwtenecystanaaltje, *Heterodera göttingiana* Liebscher, in Nederland. (The pea root eelworm in Holland.) [English summary 1 p.]
Tijdschr. PlZiekt., 1951, **57**: 52-64, bibl. 23, illus.

An account is given of the pea root eelworm, *Heterodera göttingiana*, its biology and control. Infested fields show sharply bordered patches of dwarfed, poorly branched and early yellowing plants that die prematurely. Affected plants either fail to flower or flower too early. The root system is poorly developed and contains numerous white or brown cysts. Control is possible only by crop rotation.

2625. DAVID, W. A. L., AND GARDINER, B. O. C. Investigations on the systemic insecticidal action of sodium fluoroacetate and of three phosphorus compounds on *Aphis fabae* Scop. *Ann. appl. Biol.*, 1951, **38**: 91-110, bibl. 23, illus.

The general insecticidal properties of *bis(bis-dimethylaminophosphonous) anhydride (anhydride)*, *bis(dimethylamino)fluoro oxide (oxide)*, diethyl paranitrophenyl phosphate (E 600), and sodium fluoroacetate (*acetate*) are described. All are toxic to aphids when infested plants are dipped in solutions. At the lowest concentration giving a complete kill of aphids, the anhydride is the most persistently effective of the four compounds. E 600 is the most phytotoxic compound. Systemic insecticidal action following application made

to the leaves of the broad bean is easy to demonstrate with the acetate, demonstrable with difficulty with the anhydride, and not at all with E 600 and the oxide. Sodium fluoroacetate is an extremely effective systemic insecticide whether applied to the leaves or the roots of broad bean, but it may prove to be too generally toxic or persistent for practical use. [From authors' summary.]—A.R.C. Unit of Insect Physiology, Cambridge.

2626. DUDLEY, J. E., JR., AND BRONSON, T. E.
Six years field tests with insecticidal dusts against pea aphid.

J. econ. Ent., 1950, 43: 642-4, bibl. 7.

From 1944 to 1949 several new insecticides, including DDT, hexaethyl tetraphosphate, tetraethyl pyrophosphate and parathion, have been tested in Wisconsin against the pea aphid, *Macrosiphum pisi*. The various formulations of the chemicals used and their effectiveness expressed in percent control are listed.

2627. JANY, E.
Der "Einbruch" von Erdhummeln (*Bombus terrestris* L.) in die Blüten der Feuerbohne (*Phaseolus multiflorus* Willd.). (The "invasion" of scarlet runner bean flowers by the bumble bee, *Bombus terrestris*.) Reprinted from *Z. angew. Ent.*, 1950, 32: 172-83, bibl. 11, illus.

An account is given of the "invasion" of scarlet runner bean flowers by bumble bees, that puncture the base of the flower and remove nectar without effecting pollination.

2628. BLANCHARD, F. A., AND DILLER, V. M.
Uptake of aureomycin through the roots of *Phaseolus lunatus*.

Amer. J. Bot., 1951, 38: 111-12, bibl. 5.

Lima bean plants which had been grown for 5 days under controlled conditions were used in experiments designed to investigate whether aureomycin could enter the plants through their root systems. Various concentrations of aureomycin were added to the mineral culture solution supplied to the roots. Assays for aureomycin were made on the roots, stems and leaves 1 week later. The results leave little doubt that aureomycin penetrated through the roots and was translocated to the stems and leaves of the plants. Additional work is now in progress to determine some of the effects of the aureomycin on the plants. [Authors' summary.]—Univ. Cincinnati, Ohio.

Mushrooms.

(See also 3125.)

2629. MINISTRY OF AGRICULTURE, LONDON.
Mushroom growing.
Bull. Minist. Agric. Lond. 34, revised 1950, pp. 68, illus., 3s. 6d.

This is the fifth edition of a bulletin which first appeared in 1931. Since the fourth edition was published in 1938, "investigational work on mushroom cultivation has been carried out in Britain at the Experimental and Research Station, Cheshunt, Herts, and at the Mushroom Research Station, Yaxley, Peterborough. Moreover, a great deal of fresh information has been made available, partly by the recent publication of pre-war

research in this country and partly by published results of investigations in other countries, notably the U.S.A. Much of this new information has been included in the present edition."

2630. BELS, P. J.
Enkele problemen van de champignonenteelt. (Some problems of mushroom cultivation.) *Meded. Dir. Tuinb.*, 1950, 13: 639-55, bibl. 27, illus.

The various kinds of buildings and beds in which mushrooms have been grown are mentioned with their advantages and disadvantages regarding temperature, humidity, and ventilation. Modern methods of preparing compost for mushrooms and the functions of the casing soil are described.

Onions and related plants.

(See also 2253, 2257, 2708r, 3118.)

2631. VORSTER, P. W., AND JOUBERT, T. G. LA G.
The new early onion variety: "Texas Grano." *Fng S. Afr.*, 1951, 26: 45-8; 51, bibl. 1, illus.

Trials with this variety at Pretoria are described and the results tabulated. Further breeding is being carried out with a view to selecting from Texas Grano a type which will mature even earlier, and promising results have been obtained.

2632. RODRIGO, P. A., AND OTHERS.
A comparative study on the yields of locally produced and imported seeds of onion. *Philipp. J. Agric.*, 1949 (published 1950), 14: 349-55, bibl. 2.

Onions raised from locally grown seed of the variety Red Globe were compared at 3 stations in one season with plants raised from Indian seed and with the variety Yellow Bermuda also raised from imported seed. At all three stations the local seed gave better results than the Indian Red Globe and in one case proved decidedly superior to Yellow Bermuda. The local Red Globe showed a high degree of resistance to onion blight, to which the other varieties were very susceptible.

2633. AZAREVIČ, E. M.
The dry weight, vitamin C and sugar contents of a perennial, multumbellate Altai onion. [Russian.] *Doklady vsesojuz. Akad. sel'sk. Nauk*, 1951, 16: 3: 19-22.

From the data presented it is concluded that a perennial multi-umbellate onion grown in northern Russia is a valuable food plant, having a high vitamin and sugar content.

2634. DAVIS, J. F., CUMINGS, G. A., AND HANSEN, C. M.
The effect of fertilizer placement on the yield of onions grown on an organic soil. *Quart. Bull. Mich. agric. Exp. Stat.*, 1951, 33: 249-56, illus.

Experiments carried out in Michigan on muck soil, indicate that fertilizers for onions are best placed in a band 2 in. below seed level either 1 in. to the side or directly under the seed, provided the rate of application

does not exceed 1,000 lb. per acre. Heavier rates should be applied with a grain drill.

2635. LOEVEN, W. A.

Accumulation of cytoplasm in *Allium* cells as a consequence of exposure to organic substances. I.

Proc. kon. ned. Akad. Wetensch., 1950, **53**: 1599-609, bibl. 7, illus.

A description is given of morphological changes in the epidermal cells of the bulb scales of *Allium cepa* resulting from the action of organic substances. A method for measuring quantitatively the influence of these substances is described. The results of preliminary experiments with iso-alcohols and urethanes are given.

2636. RØED, H.

***Botrytis* (gray mold) on *Allium cepa* and *Allium ascalonicum* in Norway.**

Acta Agric. Scand., 1950, **1**: 20-39, bibl. 14, illus.

Neck rot is the commonest disease of onions and shallots in Norway causing very serious losses, especially in stored onions. The author found that the species largely responsible for the damage is *Botrytis allii*. The distribution of the disease in the country and control measures are briefly discussed.—Norwegian Plant Protection Inst., Oslo.

2637. NELSON, R.

Control of onion mildew with dust fungicides.

From abstr. in *Phytopathology*, 1951, **41**: 28.

In the seasons when onion mildew was destructive, Dithane Z 78-sulphur dust gave the most effective protection.

2638. NEWHALL, A. G.

New methods of controlling onion smut.

From abstr. in *Phytopathology*, 1951, **41**: 28.

In trials in New York State over 2 seasons a duster mounted on the handles of the drill and operated by a chain drive from a front wheel has been successfully used to apply fungicide dusts into the open seed furrow just before it is closed. The following gave good control: Tersan, 10 lb. per acre; Tersan plus a diluent (1:4), 20 lb. per acre; tetramethyl thiuram disulphide (TMTD) plus pyrophyllite (1:2) and Orthocide, 15 and 20 lb. per acre. Seed pelleted with Orthocide at 1 lb. to 1 lb. of seed was also effective. Most promising was the 1:4 mixture of Tersan, plus an insecticide, at 22 lb. per acre; this also gave excellent control of the onion maggot. Good smut control was also obtained by mixing TMTD with 5-10-10 fertilizer at 60 lb. per ton, broadcast at 10 cwt. per acre and harrowed in lightly, but not disced.

2639. LABEYRIE, V., AND PONS, R.

Les bases biologiques de la lutte chimique contre la mouche de l'oignon (*Chortophila antiqua* Meigen). (The biological basis of chemical control of the onion fly.)

C.R. Acad. Agric. Fr., 1950, **36**: 440-2, bibl. 4.

Because of the rapidity of the incubation of the eggs (a maximum of 4 to 5 days) of the onion fly, its larval life within the tissues of the onion, and its pupation in the soil, the adult fly appears in practice to be the only

vulnerable stage in its life history. For control to be effective and economic it must be directed towards the adults of the first generation. It is therefore essential to know exactly when the flies appear.

2640. CHABOUSSOU, F., LABEYRIE, V., AND PONS, R.

Essais insecticides de laboratoire contre la mouche de l'oignon (*Chortophila antiqua* Meigen). (Laboratory insecticide tests for the control of the onion fly.)

C.R. Acad. Agric. Fr., 1950, **36**: 442-6, bibl. 11.

The tests described emphasize the possibility of effective control of the onion fly by treatment (e.g. with DDT preparations) against the adult flies [see previous abstract], but this can be supplemented by an ovicide, particularly rotenone in white oil (10 g. of the active product per hectolitre).

2641. ARMAND, J. E.

Onion thrips.

Processed Publ. Canada Dep. Agric. Div.

Ent. **106**, 1951, pp. 4, illus.

A description of *Thrips tabaci* with life history. DDT and chlordane have proved effective if thoroughly applied when the insects first appear in the field.

2642. WILCOX, J., AND HOWLAND, A. F.

New insecticides for control of onion thrips in Southern California.

J. econ. Ent., 1950, **43**: 690-3, bibl. 11.

Dusts containing 20% toxaphene, 2% parathion, 2.5% aldrin, 10% chlordane, BHC to give 2% γ -isomer, or 2% lindane appeared to be more effective than 10% DDT dust. TDE and methoxychlor at 10% were less effective than 10% DDT.

2643. FENJVES, P.

El pojito o trips de la cebolla. *Thrips tabaci* Lind, y su combate. (Onion thrips and their control.)

[*Publ. Minist. Agric. Cria, Caracas*, 1949, from abstr. in *Bol. inf. Colombia*, 1950, No. 9, pp. 11-12.

Experiments on the control of onion thrips were carried out in the State of Aragua, Venezuela, with DDT, toxaphene, chlordane and BHC. The best results were obtained with BHC, dusts being more effective than sprays. Dusts containing 2.3% of the gamma isomer, or sprays containing 0.06% are recommended.

Root vegetables.

(See also 2231, 2257, 2262, 2263, 2575, 2577, 2722.)

2644. BANGA, O.

Veredelingsmethodiek bij de rode biet.

(Breeding methods for red garden beet.)

[English summary $\frac{3}{4}$ p.]

Meded. Dir. Tuinb., 1950, **13**: 575-92, bibl. 7.

An account is given of the desired characters in beet and methods of breeding and selection. The principal round and flat-round varieties of garden beet in Holland are: Egyptian for early cultivation, Detroit for quality, and Crosby for cropping reliability.

2645. WELLENSEK, S. J., AND VERKERK, K.
Vernalisatie en photoperiodiciteit van bieten. (Vernalization and photoperiodism of beets.) [English summary 1 p.]
Meded. Dir. Tuinb., 1950, 13: 341-57, bibl. 4, illus.

Seed vernalization was applied by exposing germinating seeds of two varieties of garden beet and one each of sugar beet and fodder beet to a temperature of 1-2° C. for different periods. The effect of a long photoperiod (16 hrs. a day in 1948, and 24 hrs. a day in 1949) on bolting in the first year of growth was studied. Increasing the duration of vernalization was correlated with increasing sensitiveness to frost and with earlier and more frequent occurrence of bolters. Long-day treatment from time of emergence to time of transplanting greatly increased, but transplanting normal-day plants reduced, the formation of bolters. The earlier bolting started, the more good seed plants were produced.

2646. MINISTRY OF AGRICULTURE, LONDON.
Beet eelworm.
Adv. Leaflet. Minist. Agric. Lond. 233, 1950, pp. 6, illus., 1d.

The beet eelworm, *Heterodera schachtii*, is a pest of sugar beet, red beet, spinach and mangolds. Its habits are described, and the precautions necessary to prevent transporting of infested soil are mentioned.

2647. WARNE, L. G. G.
Spacing experiments on vegetables. I. The effect of the thinning distance on earliness in globe beet and carrots in Cheshire, 1948.
J. hort. Sci., 1951, 26: 79-83, bibl. 2.

In trials carried out in Cheshire, Early Wonder carrots and Crimson Globe beets were drilled in rows 18 in. apart on 10 April. The former were subsequently thinned to 1 in., 2 in., 4 in. or 6 in. and the latter to 2 in., 3 in., 4 in. or 6 in. In both cases close spacing reduced the mean root weight at the stage when a reasonable proportion of the crop had reached usable size, but the closest spacing gave the largest number of roots of acceptable size.—Manchester Univ.

2648. WARNE, L. G. G.
Spacing experiments on vegetables. II. The effect of the thinning distance on the yields of globe beet, long beet, carrots and parsnips grown at a standard inter-row distance in Cheshire, 1948.
J. hort. Sci., 1951, 26: 84-97, bibl. 8.

Carrots (2 varieties), beet (3 varieties) and parsnips (1 variety) were grown at a uniform inter-row distance, and at 5 thinning distances. The thinning distances employed gave plant populations (per foot of row) varying from approximately 2 to 6 for beet, 1.7 to 4.4 for parsnips, and 2.3 to 8.0 for one variety and 2.0 to 5.0 for the other variety of carrot. At the closer spacings the population of plants always fell far short of the expected number. Mean plant weight and root weight always increased as the space allotted to each plant increased. Generally, maximum yields were obtained with spacings much closer than those usually recommended. With globe beet and one variety of carrot, the incidence of bolting was decreased by close planting. With one variety of carrot, but not with

the other, close spacing reduced the percentage of roots splitting.—Manchester Univ.

2649. KUNKEL, L. O.
Identification of bolting disease of carrots.
From abstr. in *Phytopathology*, 1951, 41: 22.

Transmission tests are described from which it is concluded that the bolting disease of carrots in California is caused by a big-bud virus that is not identical with tomato big bud of California.

2650. VON ARX, J. A.
De phomopsisziekte van zaadwortelen. (The phomopsis disease of carrots grown for seed.) [English summary 1 p.]
Tijdschr. PLZiekt., 1951, 57: 44-51, bibl. 8, illus.

Carrot plants grown for seed may be attacked by *Phomopsis dauci* sp. nov. which kills the inflorescence and often the whole plant. Infection takes place almost exclusively through the flower, from which the hyphae extend to the rest of the inflorescence and stems. The fungus overwinters on the dead steues, so, for control of the disease, thorough removal and destruction of the plants after harvesting is recommended. The disease occurs on wild carrot, and 5 cultivated varieties tested proved equally susceptible.

2651. VAN DER HELM, G. W., AND Klapwijk, J. G.
De invloed van enige bestrijdingsmiddelen op de smaak van wortelen. (The influence of some insecticides on the flavour of carrots.) [English summary 8 lines.]
Meded. Dir. Tuinb., 1950, 13: 260-2.

Carrots treated with unpurified BHC and Trilarvex for controlling carrot fly were considered inferior to untreated carrots because of their abnormal flavour.

2652. NISHIYAMA, I., AND TAKASUGI, K.
Studies on artificial polyploid plants. XII. Investigations on the growth and yield of an autotetraploid radish, Minoyonbai-daikon.
Res. Food Sci., Kyoto Univ., 1949, No. 1, pp. 1-10, from abstr. in *Heredity*, 1950, 4: 399.

Comparative studies on the growth of two diploids (Minowase and Miyashigedaikon, $2n=18$) and an artificially induced tetraploid radish (Minoyonbai, $2n=36$) were made by weekly measurements of plant height, number of leaves, length and diameter of tap roots, etc., of about 50 individuals in each category for two successive seasons. The results obtained clearly showed that Minoyonbai (4x) and Minowase (2x) are superior to Miyashige (2x). The growth curves of the former two showed a higher vigour in Minoyonbai during the seedling stage and at the end of the season, but not in the middle of the season. Minowase is a well-known early variety in Japan. "Pithy (porous) tissue" was found in Minowase to reach 75% in 90 days, in Miyashige 40% and in Minoyonbai only 20%. In different climatic regions in Japan during 1944-1947 the yield of Minoyonbai was consistently higher than that of the diploid varieties. Minoyonbai is probably suitable for cultivation in summer as it does not bolt then.

2653. POUND, G. S., AND FOWLER, D. L.

A fusarium wilt of radish in Wisconsin.From abstr. in *Phytopathology*, 1951, **41**: 30.

A fusarium wilt of radish has recently become severe in muck soils of south-eastern Wisconsin, and its symptoms are described. Preliminary experiments indicate that the causal organism is identical with *F. oxysporum raphani* described from California.

2654. VERMA, G. S.

Soft rot of radish (*Raphanus sativus* L.).

J. Madras Univ., Sect. B, 1950, **20**: 1-16, bibl. 23, illus.

The symptoms of a hitherto unrecorded soft rot disease of radish are described. Experiments have shown it to be caused by *Pythium aphanidermatum*, and the morphology of this organism, and of two bacteria associated with it in a secondary capacity, is described. The fungus is soil-borne and usually infects the tap root. Excessive moisture and a temperature range between 28° C. and 32° C. are favourable for infection and spread.

Salad crops.

(See also 2575.)

2655. HOFFMAN, J. R.

Leaf hopper control to prevent the spread of the virus disease aster yellows in commercial lettuce production.

Quart. Bull. Mich. agric. Exp. Stat., 1951, **33**: 201-3.

Parathion, used at the rate of $\frac{1}{2}$ lb. of 15% wettable powder to 100 gal. of water to control the leaf hopper, *Macrostes divisa*, the vector of aster yellows, significantly reduced the incidence of the disease in lettuce. The residue left on the crop was well within the safety range 26-34 days after spraying.

2656. RICH, S.

Soil treatments for the field control of lettuce big-vein.

Plant Dis. Repr., 1950, **34**: 253-5, bibl. 8.

In studies in Connecticut the two most promising treatments for big-vein, a virus disease which infects lettuce through the roots [*H.A.*, 19: 390], were (1) chloropicrin diluted to one-quarter commercial strength with xylene and the mixture applied at 500 lb. per acre, and (2) formaldehyde at 1.6% applied at 1 qt. per square foot.

2657. HAASIS, F. A., AND ELLIS, D. E.

Effect of fungicidal drenches on incidence of lettuce downy mildew in the seed bed.

Plant Dis. Repr., 1950, **34**: 310-11.

Observations on the incidence of *Bremia lactucae* are described. Infection was high on control and on fumigated plots, while those that received drenches of Fermate or Tersan contained few infected plants, and plots drenched with Dithane Z-78 were free from infection.

2658. BRIAN, P. W., AND OTHERS.

Uptake of antibiotic metabolites of soil micro-organisms by plants.

Nature, 1951, **167**: 347-9, bibl. 14.

The authors describe experiments with one substance only, viz. griseofulvin, a metabolic product of *Penicillium*

nigricans and *P. griseofulvum*. In a preliminary trial lettuce seedlings were raised in water culture and the nutrient was replaced by griseofulvin-containing nutrient (10 and 20 $\mu\text{g}/\text{ml}$.) when the seedlings were well established. Eight and fourteen days after the transfer the plants were sprayed with a suspension of *Botrytis cinerea* spores. Six weeks after inoculation the control cultures were 100% infected, most of the plants being dead, while at least 60% of the treated plants were free of infection. In subsequent experiments on a more ambitious scale tomato plants grown in sand culture were infected with *Alternaria solani*. Watering the cultures with a 100 $\mu\text{g}/\text{ml}$. solution of griseofulvin gave 74% control of the disease, which proves "that griseofulvin shows undoubted activity as a systemic 'fungicide.'" Other results indicate that it is not necessary to use pure griseofulvin to secure its systemic distribution in plants but that crude cultures of either of the two fungi are sufficient for the purpose. Experiments designed to determine whether griseofulvin could be produced by microbiological synthesis in the soil, and then pass into plants, have been inconclusive.—Butterwick Res. Labs, Welwyn and Jealott's Hill Res. Stat.

2659. NEWHOOK, F. J.

Microbiological control of *Botrytis cinerea* Pers. I. The role of pH changes and bacterial antagonism.

Ann. appl. Biol., 1951, **38**: 169-84, bibl. 6.

Strains of *Bacillus*, *Pseudomonas* and *Chromobacterium* isolated from dead leaves of lettuce seedlings overwintering in the open have been proved to be antagonistic in various degrees to *Botrytis cinerea* on nutrient agar, on wounded detached lettuce leaves and on wounded leaves of lettuce seedlings at temperatures ranging from 4° to 25° C. under conditions of high moisture and humidity. The mixed bacterial flora of all dead lettuce leaves tested was potentially inhibitory to *B. cinerea* to a level as high as, or higher than, that shown by most of the test strains in pure culture. Many strains of bacteria cause lysis of young active *Botrytis* mycelium and germ tubes. [From author's summary.]—Imp. Coll. Sci. Technol., London.

2660. NEWHOOK, F. J.

Microbiological control of *Botrytis cinerea* Pers. II. Antagonism by fungi and actinomycetes.

Ann. appl. Biol., 1950, **38**: 185-202, bibl. 5.

Botrytis cinerea has been inhibited by pure cultures of many fungi and actinomycetes on lettuce extract agar, and by these and the mixed flora of soil suspensions on wounded detached lettuce leaves and on wounded leaves of living plants under conditions of high moisture and humidity. Saprophytic antagonism causes some natural control of *B. cinerea* in the field. Three-weekly applications of a dust containing tetrachloronitrobenzene gave a highly significant increase in survival, efficiency being greatly increased by using cloches.—Imp. Coll. Sci. Technol., London.

2661. WOOD, R. K. S.

The control of diseases of lettuce by the use of antagonistic organisms. I. The control of *Botrytis cinerea* Pers.

Ann. appl. Biol., 1951, **38**: 203-16, bibl. 16.

Many bacteria, actinomycetes and fungi were antagonistic to *Botrytis cinerea* in pure culture on lettuce extract agar at 25° C., a few at 15° C., and some grew and were active at 5° C. Marked control of disease occurred when young potted plants in frames were sprayed with suspensions of selected antagonists in 1.0% glucose solution.—Imp. Coll. Sci. Technol., London.

2662. WOOD, R. K. S.

The control of diseases of lettuce by the use of antagonistic organisms. II. The control of *Rhizoctonia solani* Kühn.

Ann. appl. Biol., 1951, 38: 217-30, bibl. 11.

In greenhouse experiments damping-off of lettuce seedlings was substantially controlled by selected antagonists in sterile sand, soil, or in sand/soil mixtures. Attempts were made to control the disease in the field by the use of soil amendments. One year a substantial increase in the stand of healthy seedlings was obtained by green manuring.—Imp. Coll. Sci. Technol., London.

Spinach.

2663. NOGUCHI, Y.

Studies on the polyploidy in spinach.

Jap. J. Genet., 1943, 10: 106-7, from abstr. in *Heredity*, 1950, 4: 398.

The characteristics of polyploidy, such as large and thick leaves, large stomata, small number of stomata in a definite leaf area and large flowers and seed, appeared in the colchicine-induced tetraploid spinach. Delay of flowering time, about 16 days in male and 20 days in female plants, greater fresh- and dry-weight, high water content and change of sex ratio (increase of female and bisexual plants) were also associated with polyploidy in spinach. The most interesting and important fact from the standpoint of crop production is the increase, about 15%, in vitamin A and C content.

Sweet corn.

(See also 2618, 2708b.)

2664. GALINAT, W. C., AND NAYLOR, A. W.
Relation of photoperiod to inflorescence proliferation in *Zea mays* L.

Amer. J. Bot., 1951, 38: 38-47, bibl. 40, illus.

An excessively vegetative plant has appeared in a Connecticut sweet corn inbred stock (C31), and continuous vegetative growth has been attributed to a single recessive gene (*id*). Preliminary studies are here reported on the light requirements of C31 *id* sweet corn and an analysis is made of the conditions leading to the production of intergrades between vegetative and floral expression in the proliferous maize tassel. The results indicate that a definite size, age, or number of leaves must be present on the developing plant before floral initiation can occur in this strain. The critical light-dark period for young plants of this variety is approximately 13:11 hrs. With increase in age, however, there is a slight change in critical day-length and a shorter dark period is required. Following photoperiodic induction to flower, proliferation occurs in the staminate inflorescence if the photoperiod is greater than 15 hrs. per day. When the photoperiod is between 11½ and 12½ hrs. per day non-fertile flowers are produced. A light period of approximately 10½-11½ hrs. per day, subsequent to floral initiation,

seems to be necessary for normal staminate flower development when growth of the inflorescence primordium is uninterrupted. Proliferation of the spikelet results from terminal and intercalary meristematic activity of the rachilla. The axis which is ordinarily indeterminate in the maize spikelet will, under proper photoperiod conditions following induction to flower, assume the generative activities of an ordinary stem and produce a plantlet with adventitious roots. These propagules will root vigorously in nutrient solution and can be readily grown to maturity. Length of the photoperiod during development of the floret has a strong effect upon the degree of vegetativeness of the floral parts of C31 *id* maize. A graded series was obtained in which the lemma was observed to differentiate into blade, ligule, and sheath. In the most vegetative florets the glumes developed ligules at the point of attachment to the rachilla. It was also observed that with increasing vegetative development of the spikelet there was a decrease in size of the anthers in the lower floret and, in fact, complete abortion finally occurred. A third lodicule was found in a large number of florets. This structure appears opposite the palea and seemingly arises as a divergence from one of the other lodicules.—Conn. agric. Exp. Stat. and Yale Univ., New Haven, Conn.

2665. HASKELL, G., AND DOW, P.

Studies with sweet corn. V. Seed-settings with distances from pollen source.

Emp. J. exp. Agric., 1951, 19: 45-50, bibl. 10.

Sweet-corn plants, spaced 4 ft. apart in 8 stringers 44 ft. long radiating from a central pollen mass, were grown to determine the factors influencing setting in the production of hybrid seed. A hybrid variety was used to reduce error from inter-plant variation. Plants in stringers were detasselled and later the number of seeds on main ears counted. Regression of seed-set against distance was a slight curve straightened by logs. A theoretical straight line ($y=a+bx$) was fitted to the data; this form is general for dispersal of small organisms. There was no significant difference for seed-set between stringers, perhaps due to walls reducing wind effects, but distance from source was highly significant. Seed-setting dropped to 95% at 12 ft. from pollen source and at 60 ft. was calculated to be only 10%. The number of seed-rows between pollen rows in hybrid-seed plots could be increased from 2 to 5 without loss of potential seed-yield. Row direction is not important in small plots. [Authors' summary.]—John Innes hort. Inst., Bayfordbury.

2666. STONER, W. N.

A preliminary report of results from some fungicide spray trials for control of helminthosporium leaf blight of sweet corn.

Plant Dis. Repr., 1950, 34: 312-13.

Consistent differences in the effectiveness of several materials tested were large enough to suggest that the best two materials, Dry Parzate and SR-406, may be of value for the control of *Helminthosporium turcicum* on sweet corn.

2667. DITMAN, L. P.

Fall armyworm control.

J. econ. Ent., 1950, 43: 726-7, being *Pap. Md agric. Exp. Stat.* A278.

Both DDT and parathion in given treatments gave good control of *Laphygma frugiperda* on sweet corn at the Maryland Experiment Station, and resulted in greatly increased yields.

2668. WRESSELL, H. B.
European corn borer and its control in sweet corn.
Processed Publ. Canada Dep. Agric. Div. Ent. 104, 1951, pp. 5.

The European corn borer, *Pyrausta nubilalis*, is briefly described. Of effective insecticides for its control DDT and ryania are outstanding.

Sweet potatoes.

(See also 2708f, 3117.)

2669. BOSWELL, V. R.
Commercial growing and harvesting of sweet potatoes.
Fmrs' Bull. U.S. Dep. Agric. 2020, 1950, pp. 38, illus.

All aspects of sweet potato cultivation are described. A growing preference is shown throughout the United States for the soft-fleshed varieties, of which Porto Rico, Cliett Bunch Porto Rico, Nancy Hall, Nancy Gold, Triumph and Australian Canner are the most popular, while of the firm-fleshed varieties grown more widely in the north, Big Stem Jersey, Yellow Jersey, Maryland and Orlis are the best. For industrial purposes, the heavy-yielding, high-starch-containing varieties Pelican Processor and Whitestar are recommended. The bulletin concludes with a brief description of curing and storing and a note on pests and diseases.

2670. ELMER, O. H.
Sweetpotatoes in Kansas.
Bull. Kans. agric. Exp. Stat. 341, 1950, pp. 61, illus.

This revised version of *Bulletin* 278 [see *H.A.*, 9: 1360] deals with all aspects of the production, curing, storing, marketing and pests and diseases of sweet potatoes under Kansas conditions. New information includes descriptions of new mutant varieties that have been developed in Kansas, and directions for sprout treatment with phygon, wettable spergon, dithane D14 and semesan bel. Information on diseases has also been brought up to date.

2671. FOLQUER, F., AND BRUCHER, F. J.
Informe preliminar sobre épocas para plantación y cosecha de la batata "Brasilera blanca" en Tucumán. (Preliminary report on trials to determine the effect of planting and harvesting times on the yield of the sweet potato variety "Brasilera blanca" in Tucumán.) [English summary $\frac{2}{3}$ p.]
Publ. Inst. Fitotéc. Univ. nac. Tucumán 567, 1950, pp. 20, bibl. 19, illus.

At the University of Tucumán a series of trial plots was planted every month, from September to February, with the sweet potato variety "Brasilera blanca". The plots were harvested monthly from January to July. The highest yield of vines was obtained from the plots planted in December and harvested in April, and the highest yield of roots (36.5 metric tons per

hectare) from plots planted in September and harvested in May. This last was nearly twice the amount obtained in the February harvest of the same planting. In all series except those planted in February, May harvests gave the highest yield of roots. The plots planted in October and harvested in April produced 10.41 tons per hectare more than those planted in December and harvested at the same time.

2672. BONNET, J. A., TIRADO SULSONA, P., AND ABRUÑA, F.
Effect of lime-phosphorus and green manure on sweet potatoes and corn grown in acid soils.

J. Agric. Univ. Puerto Rico, 1947 (issued June 1950), 31: 303-21, bibl. 2, illus.

In an experiment on two acid soils in Puerto Rico significant yield increases were obtained by treating sweet potatoes and corn with lime, phosphorus and green manure. Of the 4 legumes used as green manure, velvet beans were the most effective. Cowpeas alone depressed the yield of sweet potatoes. There was little difference between using the green manure as a mulch or ploughing it in.

2673. SCOTT, L. E.
Potassium uptake by the sweet potato plant.
Proc. Amer. Soc. hort. Sci., 1950, 56: 248-52, bibl. 6, being *Sci. Publ. Md agric. Exp. Stat.* A 266.

The percentage of potassium in sweet potato vines decreased during the period of growth of the fleshy roots. The Porto Rico variety showed consistently higher percentages potassium in both vines and roots than did the Maryland Golden variety. Total seasonal uptake of potassium by Porto Rico amounted to 541 lb. K_2O per acre, of which 362 lb. were present in the roots. Total uptake by Maryland Golden was 256 lb. of which 152 lb. were found in the roots. Uptake during the first two months of the season amounted to about 5% of the total. Vine growth accounted for most of the potassium utilization during the third month, while accumulation of potassium in the growth of the fleshy roots accounted for practically all of the potassium uptake during the last two months of the season. [Author's summary.]

2674. HESTER, J. B., SHELTON, F. A., AND ISAACS, R. L., Jr.
Know your soil. VII. Magnesium-potassium relation for sweet potatoes on sandy soils.
Bett. Crops, 1951, 35: 1: 17-18, 46-7, bibl. 3, illus.

In trials started in 1946 in New Jersey on Ranger sweet potatoes, Mg deficiency symptoms were prevalent when the replaceable Mg content of the soil was below 100 lb. per acre, and developed first where high potash fertilizer mixtures were used. A correlation was established between yield, K application and Mg availability. The addition of 2 to 4% MgO to fertilizers was found necessary where mixtures containing high K were used.

2675. NIELSEN, L. W.
Influence of temperature on the development of internal cork symptoms in sweet potato roots.
Abstr. in Phytopathology, 1951, 41: 28.

Porto Rico sweet potato roots infected with internal cork were collected in October, 1949, and cured 12 days at 85° F. Before and after curing approximately 60% of the roots had the cork symptom. On 29 November one lot of roots was stored at 55°-60° F. and another at 78°-80° F. At approximately 6-week intervals until 20 April, 1950, 100-root samples were sliced to ascertain the development of the cork symptom. At the higher temperature symptoms developed in 91% of the roots, and the lesions were larger and more numerous than at time of harvest. No symptom changes were detected in roots stored at the lower temperatures.

2676. McCLURE, T. T.

Fusarium foot rot of sweet-potato sprouts.

Phytopathology, 1951, 41: 72-7, bibl. 8, illus.

Certain isolates of *Fusarium solani* from rotted sweet potatoes were mildly pathogenic to sweet-potato sprouts, and when freshly cut sprouts were inoculated with these isolates they were protected from subsequent infection by the sweet-potato wilt fungus, *Fusarium oxysporum* f. *batatas*.—Univ. Calif.

2677. MARTIN, W. J., AND PERSON, L. H.

Surface rot of Porto Rican sweet potatoes.

Phytopathology, 1951, 41: 228-30, bibl. 1, illus.

A surface rot of Porto Rican sweet potatoes is distinct from that reported on other varieties of sweet potatoes. It is caused by a species of *Fusarium*.—La Agric. Exp. Stat.

Tomatoes and related plants.

(See also 2216, 2266, 2575, 2592, 2708a, g, k, u, 2712, 2727, 2728, 2759, 2772, 3110, 3115, 3141.)

2678. BONIFACIO, P.

Risultato di prove di innesto con alcune solanacee. (**Grafting solanaceous plants.**)

Riv. Ortoflorofruttic. ital., 1951, 35: 42-3.

After a reference to grafting experiments with *Solanum* spp. in Russia, the author describes successful results in the autumn with budding the eggplant, tomato and pepper on to *Solanum latifolium* (a perennial, spinous, bushy plant). The eggplant and tomato scions flowered and fruited earlier than normally-grown plants, and transplanting was avoided.

2679. DECKER, P.

Phomopsis-blight-resistant eggplants.

From abstr. in *Phytopathology*, 1951, 41: 9.

Two phomopsis-resistant varieties of eggplant have been developed and released. They have been named Florida Market and Florida Beauty.

2680. SCHRADER, O. L.

Uma nova variedade de pimentão para o Brasil. (**A new variety of pimiento for Brazil.**)

Rev. Ceres, 1949, 8: 90-5, bibl. 7, illus.

This is a description of the variety Perfection of *Capsicum frutescens* and of the characters of the fruit, with notes on steps taken to obtain improved strains and on the qualities to be considered in selection.

2681. MAYEUX, H. S., AND WENE, G. P.

Control of serpentine leaf miner on pepper.

J. econ. Ent., 1950, 43: 732-3, bibl. 1.

Good control of a serpentine leaf miner, believed to be *Liriomyza pusilla*, was obtained in the Lower Rio Grande Valley with a 5% chlordane-DDT dust applied weekly at 20 lb. per acre.

2682. MAGELLI, E.

La coltivazione del pomodoro. (**Tomato culture.**)

Humus, 1951, 7: 3: 14-17, illus.

A general account is given on the cultivation of tomatoes in Italy, where this crop occupies 75,000 hectares, together with practical cultural advice and notes on varieties.

2683. AGATI, G.

Osservazioni su alcune razze di pomodoro delle Isole Canarie. (**Observations on some tomato varieties from the Canary Islands.**)

Riv. Ortoflorofruttic. ital., 1951, 35: 29-32, illus.

The problem of cultivating early tomatoes in Italy is discussed with particular reference to varieties from the Canary Islands. The biometrical characters of some of these varieties are tabulated and brief descriptions given.

2684. SACHS, L.

"Vegetative hybridization" in the tomato.

Nature, 1951, 167: 282-3, bibl. 3, illus.

In pursuance of his earlier study on the effect of inter-varietal grafting on leaf shape and fruit colour in tomato (*H.A.*, 20: 4), the author raised about 1,200 plants from the seed produced by his grafts. As the treatment did not produce any visible effect in the progeny of the grafted tomatoes, it is concluded that inter-varietal grafting has had no observable influence on leaf shape or fruit colour either in the year of grafting or in the following generation. These results, therefore, do not support the claims of the Russian investigators.—School of Agriculture, Cambridge.

2685. GLAVINIĆ, R.

Vegetative hybrids of mixed heredity (chimaeras). [Jugoslav with French and Russian summaries.]

Annuaire Fac. Agron. Sylvic. Skopje 1947/48, 1949, Vol. 1, pp. 151-69, illus.

Vegetative hybrids of dwarf Champion tomato and *Solanum nigrum* are stated to have been produced by the Winkler method in the U.S.S.R. First and second generation seedlings have been obtained from which plants possessing chimaeral characteristics were isolated. It is claimed that chimaeras are thus vegetative hybrids of mixed heredity.

2686. HARRISON, A. L.

Breeding tomatoes for disease resistance.

From abstr. in *Phytopathology*, 1951, 41: 16.

Commercial type tomatoes with resistance to fusarium wilt, alternaria collar rot, and root-knot nematode have been developed by using a combined inoculation technique.

2687. VERKERK, K., AND WELLENSIEK, S. J.

De invloed van kunstmatige bestuiving en belichting bij tomaten. (**The influence of artificial pollination and illumination on tomatoes.**) [English summary 7 lines.]

Meded. Dir. Tuinb., 1950, 13: 620-8, bibl. 2, illus.

Artificial pollination with Cottrell-Dormer's "buzzer" (see *H.A.*, 18:2082) increases earliness, yield, and average fruit weight in hothouse tomatoes. Illumination before transplanting improves earliness but lowers total yield. Combining artificial pollination and illumination improves both earliness and yield. Artificial pollination should include all trusses.

2688. TRECCANI, C. P.

Ulteriori ricerche sull'azione del sale ammonico del 2-4 diclorofenossiacetico sulla produzione e precocità del pomodoro e cetriolo. (Recent studies on the action of the ammonium salt of 2,4-D in inducing precocity in tomatoes and cucumbers.) [English and French summaries 9 lines each.]

Riv. Ortoflorofruttic. ital., 1950, 34: 177-83, bibl. 11.

The application of 2,4-D at 10 and 8 p.p.m. to field tomatoes caused them to be 6-7 days earlier in ripening with a crop increase of about 16%; under glass, plants were 15-20 days earlier but with no increase of crop. On forced cucumbers the crop was increased by about 30% and maturity advanced by 3-4 days.

2689. CAMPBELL, J. A.

Anhydrous ammonia as a source of nitrogen for cabbage, tomatoes, and beans.

Proc. Amer. Soc. hort. Sci., 1950, 56: 253-6, bibl. 1.

In trials over 2 years in Mississippi anhydrous ammonia proved as effective a source of N as ammonium nitrate or nitrate of soda for cabbage, tomatoes and beans, and with beans proved superior to nitrate of soda. With tomatoes, applying ammonia 6 in. deep in a split application gave better results than a single application at the same depth, or a split application 4 in. deep. Data collected during 1949 indicate that the time of application of anhydrous ammonia may influence the development of concentric growth cracks on tomato fruits.

2690. KACNELJSON, S. M.

The effect of various forms of nitrogen fertilizers on the growth of tomatoes. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1950, 72: 181-3, bibl. 10.

Experiments were carried out using sodium nitrate, ammonium sulphate, and ammonium nitrate on tomato plants in pots. It was found that the ammonium forms of N fertilizer not only encouraged growth but hastened the maturing of the plants.

2691. ARNOLD, C. Y., AND SCHMIDT, W. A.

Soil tests as a measure of phosphorus available to tomatoes on heavy soils.

Soil Sci., 1951, 71: 105-15, bibl. 8.

Data obtained mainly in Illinois show a phosphorus soil test to be correlated with the response of tomatoes to phosphate fertilizer. The best correlation was obtained by comparing the results of soil tests with yields obtained on unphosphated soil expressed as a percentage of the yields obtained from adequately phosphated soil. Tissue tests were also found to be correlated with the soil test at a particular sampling date. The relationship changed on different dates,

tissue samples taken in July being most consistent in their relationship to the soil test.

2692. EATON, S. V.

Effects of sulfur deficiency on growth and metabolism of tomato.

Bot. Gaz., 1951, 112: 300-7, bibl. 6, illus., being *Contr. Hull Bot. Lab.* 621.

In agreement with the results of previous work on other plants, the author found sulphur-deficient tomatoes to show chlorosis of leaves, anthocyanin development in leaves and stems, small stiff leaves, and thin stems. Chemically the sulphur-deficient plants had high starch, sucrose, total soluble N, ammonia, amides and nitrates in the stems with a low reducing sugar content. Differences in the results obtained in comparable experiments by other workers in New Brunswick are attributed to different climatic conditions.—University of Chicago.

2693. MARX, T.

L-Ascorbinsäure und Tomaten. (L-ascorbic acid and tomatoes.)

Landw. Forschung, 1950, 2: 1: 74-80, bibl. 10.

Three years' experiments with numerous tomato varieties showed that (1) no relationship existed between fruit size and ascorbic acid content; (2) the mean ascorbic acid content was 20-25 mg. % with a range from 14.7 mg. % to 44.6 mg. %; (3) the ascorbic acid content increased from the lower to the higher trusses. Observations suggest that breeding may increase the ascorbic acid content of the fruit, but the question whether differences in ascorbic acid content exist between varieties needs further study. In one case it appeared probable that solar radiation and rainfall affected the ascorbic acid content of tomatoes.—Biol. Zentralanstalt, Berlin-Dahlem.

2694. STONER, W. N., AND HOGAN, W. D.

A report of graywall or internal browning of tomato in South Florida.

Plant Dis. Repr., 1950, 34: 379-80, bibl. 6.

Data obtained indicate that this disorder is not due to a transmissible pathogen; it is believed to be caused by physiological factors.

2695. SMITH, P. G., AND GARDNER, M. W.

Resistance in tomato to the spotted-wilt virus.

Phytopathology, 1951, 41: 257-60, bibl. 11.

Observations in field plots during 12 years have shown Porter's strain of Red Currant tomato to have escaped infection consistently. The German Sugar variety is moderately resistant. Hybrids of Red Currant and standard varieties have yielded lines, including the Pearl Harbour types, with an intermediate level of resistance, characterized by a tendency to escape early infection and bear a crop despite late infection.—Calif. Univ.

2696. MEZZETTI, A.

La "macchiatura batterica" dei frutti di pomodoro prodotta dalla *Pseudomonas tomato* (Okabe) Breed et al. (The "bacterial spotting" of tomatoes produced by *Pseudomonas tomato*.) [English summary 8 lines.] *Ann. Sper. agrar.*, 1951, 5: 95-110, bibl. 19, illus.

Bacterial spotting of tomatoes has been observed in Puglia, Italy, and the identity of the organism with *Pseudomonas tomato* has been determined by morpho-physiological and pathogenic tests.

2697. POUND, G. S.

Effect of air temperature on incidence and development of the early blight disease of tomato.

Phytopathology, 1951, **41**: 127-35, bibl. 7, illus.

Four isolates of *Alternaria solani* were studied in the laboratory and in the greenhouse. Leaf infection with two isolates was markedly lower when plants were placed in humidity chambers at 13° and 17° C. for 48 hrs. than when at 21° and 25° C. With the other two isolates considerable infection occurred at all four temperatures. In the collar-rot phase of the disease all four isolates produced progressively more severe symptoms from high to low temperature.—Univ. of Wisconsin.

2698. CHAPMAN, R. A.

Relation of specific chemotherapeutants to the infection court.

From abstr. in *Phytopathology*, 1951, **41**: 6-7.

Tests are described in which chemotherapeutants directly inhibiting pathogen activity were applied, prior to inoculation, against the elm-twig-invading *Ceratostomella ulmi* (Dutch elm disease) and the tomato-root-invading *Fusarium lycopersici* (wilt). Against the latter, but not the former, n-octadecyltrimethylammonium pentachlorophenate and n-(4-nitrophenyl)-3,4-dichlorobenzenesulphonamide were effective.

2699. WILSON, J. D.

Comparative performance of 40 fungicidal formulations in the control of a severe outbreak of tomato late blight.

From abstr. in *Phytopathology*, 1951, **41**: 39.

Of the various formulations tested, ranked on the basis of the percentage of fruits affected with late blight [*Phytophthora infestans*], the first 11 contained copper, either used alone or in combination with various other materials. The next 3 places were taken by various ethylene bis dithiocarbamates. Near the bottom of the list were a number of dimethyl dithiocarbamates.

2700. FULTON, J. P., AND FULTON, N. D.

Phytophthora root rot of tomatoes.

Phytopathology, 1951, **41**: 99-101, bibl. 4.

A root rot of field tomatoes in Arkansas was found to be caused by *Phytophthora parasitica*. Symptoms developed most rapidly on young plants as a very rapid rot and collapse of the tap roots and stems. The addition of organic matter to unsterilized soil reduced disease development; when added to sterilized soil it increased disease development.—Ark. agric. Exp. Stat., Fayetteville.

2701. HANNON, C. I., AND WEBER, G. F.

A leaf spot of tomato caused by a new *Stemphylium* sp.

From abstr. in *Phytopathology*, 1951, **41**: 15.

A circular to irregular leaf spot, 1-4 mm. in diameter, of watery-grey colour and slightly sunken when young,

but becoming dry and brown with age, and sometimes surrounded by a light chlorotic halo, appeared naturally on tomato plants and caused defoliation. The lesions yielded an organism of the *Stemphylium* type, which is described.

2702. DEEMS, R. E.

Trichothecium fruit rot of glasshouse tomatoes.

From abstr. in *Phytopathology*, 1951, **41**: 9-10.

A minor fruit rot of glasshouse tomatoes, caused by *Trichothecium roseum* Link, is described. Available evidence indicates that the disease may be economically important only when tomatoes are cultivated under moist conditions and at temperatures near 19-22° C. Cross-inoculation tests resulted in rots of apples, bananas, peaches, pears and quinces.

2703. VANETTI, F.

Medidas de combate à "broca do tomate" (*Leucinodes elegantalis* Guén., Pyralididae, Lepidoptera). (Control measures against the tomato fruit borer.)

Rev. Ceres, 1950, **8**: 282-5, bibl. 3.

The life cycle of *Leucinodes elegantalis* and the damage it causes to tomatoes are described. Control measures suggested include the eradication of wild host plants, clean cultivation, destruction of infested fruits and spraying with a nicotine sulphate preparation.

2704. FIGUEROA P., A.

El cogollero del tomate en el Valle del Cauca, *Keiferia lycopersicella* (Busk). (The tomato pinworm in the Valle del Cauca [Colombia].) [English abstract $\frac{1}{2}$ p.]

Acta Agron. Palmira, 1950, **1**: 1-18, bibl. 14.

The tomato pinworm is a pest of economic importance in the Valle del Cauca in Colombia. The only other part of the republic from which it has been reported is the Department of Caldas. Data are presented on the biology and habits of the insect and the damage caused. The cultural control measures recommended include crop rotation, burning the plants after harvest, burying infested fruits, thorough cultivation of the soil, and elimination of all wild tomato plants in the area. For chemical control, repeated applications of 70% cryolite dust or 50% wettable DDT are recommended.

2705. MICHELbacher, A. E., AND OTHERS.

Field dusting with DDT to control thrips and spotted wilt in tomatoes.

Plant Dis. Repr., 1950, **34**: 307-9, bibl. 3.

Field experiments with DDT for the control of thrips, the vector of spotted wilt, yielded somewhat uneven results, but in some cases excellent control was obtained.—Univ. Calif.

2706. MOORE, C. A.

Market preferences for fresh tomatoes at St. Louis, Missouri.

Bull. Ark. agric. Exp. Stat. **494**, 1950, pp. 16, illus.

The study included wholesale, retail and consumer preferences, in type, size and packing. Globe-shaped tomatoes of No. 1 size were preferred by all three, but whereas retailers desired 1-lb. consumer packages the consumers preferred purchasing in bulk.

Other crops.

2707. BACON, J. S. D., AND EDELMAN, J.
The carbohydrates of the Jerusalem artichoke and other compositae.
Biochem. J., 1951, 48: 114-26, bibl. 30, illus.

Various techniques, including qualitative and quantitative paper partition chromatography, were used at Sheffield University to examine the carbohydrates of the Jerusalem artichoke (*Helianthus tuberosus*) and several other members of the Compositae. A series of at least 7 non-reducing sugars with R_F 's ranging from that of sucrose to zero was demonstrated. These substances, present in the stems, tubers and roots of the Jerusalem artichoke and the underground organs of 7 other species including dahlia and lettuce, consisted chiefly of fructofuranoside residues, but contained glucose residues proportionate to their R_F 's. The fructose residues were distributed evenly in all components with R_F 's high enough to permit isolation, and in the artichoke tuber the total fructose residues of the 5 components with highest R_F 's varied from 15% in September to 55% in early spring.

Noted.

2708. a ALEXANDER, L. J.
Effect of tobacco-mosaic disease on yield of tomato.
From abstr. in *Phytopathology*, 1951, 41: 1.
- b BLANCHARD, R. A., AND GOUCK, H. K.
DDT-oil emulsion for combined control of corn earworm and European corn borer.
J. econ. Ent., 1950, 43: 734-5, bibl. 1.
- c BOURDILLON, J.
A crystalline bean seed protein in combination with phytic acid.
J. biol. Chem., 1951, 189: 65-72, bibl. 12.
- d BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE.
Imported cabbageworm (*Pieris rapae* (L.)).
Pict. Sheet U.S. Dep. Agric. Bur. Ent. Plant Quar. 9, 1951, pp. 2, illus., 5c.
- e CAPINPIN, J. M., AND IRABAGON, T. A.
A genetic study of pod and seed characters in *Vigna*.
Philipp. Agric., 1950, 33: 263-77, bibl. 7.
Using 3 varieties of "sitao", *Vigna sesquipedalis*, a long-podded pole bean.
- f CHEVALIER, A.
L'origine et la dispersion de la patate douce: *Ipomaea batatas* (L.) Poir. *Batatas edulis* Choisy. (The origin and distribution of the sweet potato.)
Rev. int. Bot. appl., 1951, 31: 50-2, bibl. 5.
- g DIMOND, A. E.
Continuous gamma radiation suppresses crown-gall formation in tomatoes.
From abstr. in *Phytopathology*, 1951, 41: 10.
- h FAAN, H. C., AND JOHNSON, J.
Strains of the cucumber-mosaic virus.
From abstr. in *Phytopathology*, 1951, 41: 11.
- i FAAN, H. C., AND JOHNSON, J.
Overwintering of the cucumber-mosaic virus.
From abstr. in *Phytopathology*, 1951, 41: 12.
- j HAGEDORN, D. J.
The reaction of Perfection-type peas to Wisconsin bean virus 2 isolates from pea.
From abstr. in *Phytopathology*, 1951, 41: 15.
- k HARE, W. W.
Resistance to nematodes in pepper [*Capsicum frutescens*].
From abstr. in *Phytopathology*, 1951, 41: 16.
- l IBBOTSON, A., AND KENNEDY, J. S.
Aggregation in *Aphis fabae* Scop. I. Aggregation on plants.
Ann. appl. Biol., 1951, 38: 65-78, bibl. 13.
- m KENDRICK, J. B., Jr.
The influence of temperature upon the incidence of rhizoctonia root rot of Lima beans.
From abstr. in *Phytopathology*, 1951, 41: 20.
- n KENDRICK, J. B., Jr., ANDERSON, L. D., AND DICKSON, R. C.
Source and seasonal spread of certain viruses in peppers in southern California.
From abstr. in *Phytopathology*, 1951, 41: 20.
- o MCKEEN, C. D.
Fusarium wilt of muskmelons and watermelons in south-western Ontario.
From abstr. in *Phytopathology*, 1951, 41: 26.
- p MACLAGAN, D. S.
Wireworms.
Adv. Leaf. W. Scot. agric. Coll. 13, [1951 ?], pp. 4.
- q MINISTRY OF AGRICULTURE, LONDON.
Cabbage aphid.
Adv. Leaf. Minist. Agric. Lond. 269, 1951, pp. 4, illus., 1d.
- r MONTELARO, J., AND TIMS, E. C.
Louisiana shallots.
Agric. Ext. Publ. La Div. agric. Ext. 1051, 1950, pp. 12, being revision of *Ext. Circ.* 260, issued 1946.
- s MYERS, H. E., AND SMITH, F. W.
Fertilizer recommendations for Kansas.
Circ. Kans. agric. Exp. Stat. 264, 1950, pp. 24.
- t NELSON, R.
Michigan State Green-gold: a new celery resistant to fusarium yellows.
Quart. Bull. Mich. agric. Exp. Stat., 1951, 33: 280-5, bibl. 2, illus., being *Contr. Dep. Bot. Plant Path. Mich. St. Coll.* 51-2.
- u PORTE, W. S.
Tomato hybrids between fertile lines without flower emasculation.
Seed World, 1951, 68: 3: 18, 21, 46-7, bibl. 6, illus.
- v SILL, W. H., Jr.
Some characteristics of a virus inhibitor in cucumber.
From abstr. in *Phytopathology*, 1951, 41: 32.

- W SMITH, O. J., AND PETERSON, A.
Microctonus vittatae, a parasite of adult flea beetles, and observations on hosts.
J. econ. Ent., 1950, 43: 581-5, bibl. 13.
- X VARNEY, E. H., AND MOORE, J. D.
Effect of temperature on symptom expression of a virus disease of cucumber transmitted mechanically from sour cherry.
From abstr. in *Phytopathology*, 1951, 41: 36.
- Y WALKER, J. C., AND LARSON, R. H.
Progress in the development of clubroot-resistant cabbage.
From abstr. in *Phytopathology*, 1951, 41: 37.
- Z WALKER, J. C., AND WILES, A. B.
Development of a scab-resistant pickling cucumber for Wisconsin.
From abstr. in *Phytopathology*, 1951, 41: 37.
2709. a WEI, C. T., AND SCHEFFER, R. P.
Relation of host nutrition to the development of bacterial wilt of cucumber and fusarial wilt of watermelon.
From abstr. in *Phytopathology*, 1951, 41: 38.
In sand culture experiments with long- and short-day exposures.
- b WILES, A. B.
Studies on *Pseudomonas lachrymans* in cucumber.
From abstr. in *Phytopathology*, 1951, 41: 38.
The relation of the organism to the seed and other host tissues.
- c YARWOOD, C. E.
Rust infection increases invasiveness of tobacco-mosaic virus in bean.
From abstr. in *Phytopathology*, 1951, 41: 39.

POTATOES.

General.

2710. SCHRUMPF, W. E.
Effect of potato acreage adjustments on farm practices in Aroostook County, Maine, 1948 and 1949.
Bull. Me agric. Exp. Stat. 485, 1950, pp. 67, illus.

The purpose of this study is to present to potato growers information helpful in the farm management and cost adjustments made necessary by the reduction in potato acreage allotments. Information presented, covering different areas and farms of different sizes in Aroostook County, has to do with production practices, livestock, farm power, equipment, potato storage, farm labour, and farm capital investment. [From author's summary].

2711. BROADBENT, L.
The microclimate of the potato crop.
Quart. J. roy. met. Soc., 1950, 76: 439-54, bibl. 6.

Shade temperatures and humidities in a standard screen and at an arbitrary level of 15 cm. in potato crops were recorded continuously during the three summers, 1947-49. During 1948 and 1949 more precise discontinuous records were taken of temperature, humidity and wind speed in and above potato crops with different densities of foliage in a variety of weather conditions. The results, which are given in detail, demonstrate the considerable microclimatic effect produced by the crop, particularly as regards temperatures during dry, sunny periods.—Rothamsted exp. Stat.

2712. WAGGONER, P. E., AND SHAW, R. H.
Plant part temperatures influencing the epiphytology of potato and tomato late blight.
From abstr. in *Phytopathology*, 1951, 41: 36-7.

The influence of shading, cloud cover, time of day, species, spacing in the row and plant part upon the temperature of that part was determined. Shaded leaflets were more than 10° F. cooler than exposed

leaflets, the difference decreasing in cloudy weather. Little difference was found between potato and tomato plants and between wide and close spaced plants. Leaflet, petiole and upper stem temperatures were approximately equal; lower stem temperatures were as much as 5° F. cooler. Evidently conduction of heat down the stem to the cooler subsoil cools the lower stem and could enable *Phytophthora infestans* to survive hot weather.

Breeding and varieties.

(See also 3096, 3101.)

2713. BOYD, A. E. W.
Susceptibility of *Solanum curtilobum* to *Spongopora subterranea* (Wallr.) Johnson.
Nature, 1951, 167: 412, bibl. 4.

Although immunity from *Spongopora subterranea*, the causal organism of powdery scab of potatoes, may exist within the species *Solanum curtilobum*, it was shown that certain lines are susceptible, at least in the stolons and roots.—Plant Path. Lab., Corstorphine, Edinburgh.

2714. VAN HOOF, H. A.
Enkele gegevens omtrent productie en gevoeligheid voor *Phytophthora infestans* de Bary in Indonësie van een 26-tal aardappelvarieteiten. (Data on the productivity and susceptibility to *Phytophthora infestans* of 26 potato varieties in Indonesia.)
Landbouw, 1950, 22: 408-10.

A comparison was made between the performance of 26 varieties of potato imported from Holland and that of Eigenheimer, the standard variety in Java. In each case one of the trial plots was sprayed with bordeaux mixture and the other left unsprayed. It was found that the Dutch classification of the varieties according to their susceptibility to blight did not apply in Java. In these trials the most promising varieties were Profijt and Gloria which, both sprayed and unsprayed, were much more resistant to blight than was Eigenheimer; Profijt, moreover, gave higher yields.—Gen. agric. Res. Stat., Bogor.

Cultivation and nutrition.

(See also 2257.)

2715. SPARROW, A. H., AND CHRISTENSEN, E.
Effects of X-ray, neutron, and chronic gamma
irradiation on growth and yield of potatoes.
From abstr. in *Amer. J. Bot.*, 1950, 37: 667.

Latin square plots of Katahdin potatoes were planted following exposure of the tubers to 18·75, 75, 300, 1,200, and 4,800 roentgens of 200 KVP X-rays. Control pieces were taken from each tuber before irradiation and included in each Latin square. Irradiation was given at a constant rate of about 4,800 r. per hour. Statistical analysis showed no significant effect on yield following 18·75, 75, and 300 r., but did show a significant adverse effect following 1,200 and 4,800 r. Tubers given the latter treatments produced, respectively, 75% and 4% of the yields produced by the controls. True seed was collected from the 18·75, 75, and 300 r. groups. Statistical tests of germination showed a significant trend toward better germination in the seed from the 300 r. group over the 18·75 r. and 75 r. groups. Further tests are under way. Latin square plots of the same variety were planted in a field where a centrally located gamma source of approximately 16 curies of Cobalt 60 provided continuous irradiation of 0·26, 1·15, 4·8, 19·5, and 79·7 r. per day to give full-season totals of approximately 28, 123, 516, 2,086, and 8,529 r., respectively. Chronic gamma irradiation over this range of dosages produced no significant relationship between dosage and yield. There was no evidence of adverse effects on growth or yield even at the highest dosage. The effects of fast neutron acute irradiation are also under investigation.—Brookhaven nat. Lab., Upton, L.I., N.Y.

2716. JONES, E. W.
Production in potato of leaf symptoms
observed on plants on acid soils together
with associated tuber necrosis.

Nature, 1951, 167: 568-9, bibl. 14, illus.

Leaf symptoms in potato, characteristic of calcium deficiency and hitherto seen only in the field under acid-soil conditions, were produced in sand culture by a plentiful supply of readily available iron with luxury concentrations of potassium. The symptoms, which were accentuated by low phosphorus status, developed in the youngest leaves of newly formed lateral shoots. They began with rolling of the leaves and basal mottling effects which led to complete chlorosis of the lamina or bleaching of the basal part and finally to defoliation. Affected plants also showed two types of tuber necrosis: (1) external necrosis appearing only in the highest potassium treatments and (2) medullary necrosis.—Long Ashton Res. Stat.

Metabolism, growth and composition.

2717. LEVITT, J.
The isolation and preliminary fractionation
of proteins from dormant and growing
potato tubers.
Plant Physiol., 1951, 26: 59-65, bibl. 5.

In order to obtain more information about the various proteins in the potato tuber, proteins were extracted from freeze-dried tubers of the variety Russet Burbank

and were fractionated. The results are tabulated. As a test of the possible usefulness of the fractionation procedure, experiments were carried out to determine whether or not any change in protein fractions is associated with the breaking of dormancy. It was found that tuber halves that sprouted at room temperature had higher percentages of soluble protein than the control halves kept at 0-5° C. Tuber halves that failed to sprout at room temperature had the same percentage of soluble protein as the controls. Still larger relative increases in acid-insoluble protein occurred in the halves that sprouted. The NaCl-soluble fraction decreased.—Univ. Missouri, Columbia.

2718. HILTON, R. J.
Factors in relation to tuber quality in
potatoes. II. Preliminary trials on bitterness
in Nette Gem potatoes.
Sci. Agric., 1951, 31: 61-70, bibl. 23.

From a review of literature it was assumed that bitterness was due to solanine, a glycosidal alkaloid. Bitterness was concentrated in the cortical region generally and near the eyes particularly. Low temperature storage caused or maintained bitterness, as did exposure to reduced daylight.—University of Alberta.

2719. PROKOŠEV, S. M.
Traumatic formation of vitamin C in sliced
potatoes. [Russian, English summary ½ p.]
Biohimija, 1944, 9: 36-54, bibl. 21 [received
1951].

When potato tubers are cut into pieces and kept for some time in air at ordinary temperature, the ascorbic acid content rises. The formation of the vitamin is most intense in the undamaged cells in the immediate neighbourhood of the cut surface and gradually diminishes in the deeper layers. In old tubers the maximum increase after cutting attains the level characteristic for young tubers, i.e. about 40-50 mg. %.

Virus diseases.

(See also 2437, 3096, 3127.)

2720. VAN SLOGTEREN, E.
Serologie ten dienste van het virusonderzoek
bij planten. (Serology for virus-research of
plants.) [English summary 7 lines.]
Meded. Dir. Tuinb., 1950, 13: 688-702,
bibl. 7, illus.

The possibilities and difficulties of the serological diagnosis of plant viruses are discussed. Antisera against 15 different virus diseases are mentioned. The application of serological diagnosis on a large scale has been made possible by using horses in the preparation of the antisera, and the use of an agglutination-reaction. A polyvalent antiserum was made for the diagnosis of potato-X, potato-Y and potato-aucuba viruses.

2721. BONNEMAISON, L.
Diverses méthodes de protection des plantes
cultivées contre les maladies à virus.
(Methods of protecting cultivated plants
against virus diseases.)
C.R. Acad. Agric. Fr., 1950, 36: 527-9,
bibl. 3.

The various measures that can be adopted against

plant viruses, particularly of potatoes, are described under (1) the suppression of primary and secondary host plants, (2) isolation of plots, (3) cultivation in selected regions, (4) screening, (5) late sowing (for beetroots), (6) the use of aphicides.

2722. BONNEMAISON, L.
Observations biologiques sur le puceron gris du pêcher (*Myzus persicae* Sulz.) et le puceron noir (*Aphis fabae* Scop.) en relation avec la transmission des maladies à virus de la pomme de terre et de la betterave. (Observations on the green peach aphid and the black aphid in relation to the transmission of virus diseases of potato and beetroot.) *C.R. Acad. Agric. Fr.*, 1950, 36: 525-7, bibl. 2.

The numbers of *Myzus persicae* on potatoes and of *M. persicae* and *Aphis fabae* on seed plants of beetroot are recorded for the period from the middle of May to the end of July. The numbers for *A. fabae* on beetroot were greatest about the middle of June, those for *M. persicae* on potatoes about the third week in July.

2723. BONDE, R., AND MERRIAM, D.
Potato spindle tuber control. *Bull. Me agric. Exp. Stat.* 487, 1951, pp. 13, illus.

Spindle tuber is a virus disease of the potato which affects both the plants and the tubers. The symptoms vary with the variety and the environment under which the plant is grown. The most characteristic symptom is the formation of erect and slightly dwarfed plants that produce rough, elongated, and spindle-shaped tubers. The disease may be transmitted by aphids and by certain biting insects, and is readily spread by contamination of the seed stock by mechanical means during the process of storing, handling, and planting.

2724. LADEBURG, R. C., LARSON, R. H., AND WALKER, J. C.
Origin, interrelation and properties of ringspot strains of virus X in American potato varieties. *Res. Bull. Wis. agric. Exp. Stat.* 165, 1950, pp. 47, bibl. 41, illus.

Isolations from severely diseased plants of several recently introduced potatoes when inoculated to *Nicotiana rustica* at 24° C. yielded a ringspot type of virus X apparently free of mottle. A clear concentrically lined ring was always the dominant lesion type. Other types were also isolated. The results obtained support the view that many strains of virus X exist, and that attempts to classify strains on the basis of symptoms alone are inadequate.

Fungous and bacterial diseases.

(See also 2421, 2583, 3096.)

2725. VAN EEK, T., AND THUNG, T. H.
Resultaten van onderzoekingen omtrent aardappelziekten op Java. (Results of investigations on potato diseases in Java.) [English and Javanese summaries ½ p. each.] *Landbouw*, 1950, 22: 303-46, bibl. 23, illus.

The manuscript of this paper was prepared in 1941 but publication was delayed as a result of the war. An account is given of the work that has been done in Java on the control of bacterial wilt (*Bacterium solanacearum*), blight (*Phytophthora infestans*) and virus diseases of potatoes. For the control of wilt, treatment of the soil with sulphur to lower the pH gave very variable results and the cost was high. On suitable soil, however, working ± 50 g. sulphur into the soil from which an infected plant has been removed is recommended. Rotation of crops and organic manuring had little effect on the development of infection. Blight appeared in Java in 1936 and has since become a serious problem. The solution to the problem of both these diseases lies in the breeding of resistant varieties. As no cultivated variety has been found that is resistant to both diseases, wild species and hybrids are being used for breeding. A summary of this work has been published in *Phytopathology*, 1947, 37: 373-81 [H.A., 17: 2296]. The most important virus diseases in Java are leaf-roll and Y-virus disease. Lists are given of the wild species and hybrids which were found to be infected by these diseases. The Y-virus was found to be spread by aphids.

2726. VAN HOOF, H. A.
Notes on the weathering of copper sprays in connection with the control of *Phytophthora infestans* de Bary. [Javanese summary 1½ pp.] *Contr. gen. agric. Res. Stat. Bogor* 113, 1950, pp. 12, bibl. 5, illus.

It was found that the copper residue of various fungicides could be determined quite effectively by means of copper prints made on filter paper which had been moistened with rubenic acid. This method and chemical analyses were used in randomized block experiments to compare the adhesiveness of bordeaux mixture and copper oxychloride sprays, with and without a spreader, on potato leaves. Bordeaux had greater initial adhesiveness and left more residue than copper oxychloride, but in both cases a spreader (Teepol) reduced the initial adhesiveness and the amount of residue. Decrease of copper residue appeared to be dependent on time rather than on rainfall. In this experiment only slightly higher yields were obtained in blocks sprayed with bordeaux than in blocks sprayed with copper oxychloride or cuprous oxide, but in another experiment the superiority of bordeaux over 0.8% copper oxychloride was highly significant. Organic mercury preparations proved to be quite ineffective for control of late blight. The results of these trials suggest that copper oxychloride is suitable for use as a blight-control spray, but that further experiments should be carried out with higher concentrations of the compound.

2727. WALLIN, J. R.
Response of the tomato and potato in field plots inoculated with *Phytophthora infestans*.

From abstr. in *Phytopathology*, 1951, 41: 37.

A potato isolate of *Phytophthora infestans* was used to inoculate potatoes in interplanted tomato and potato plots in Iowa and Indiana. In two cases severe blighting of potatoes occurred 5 to 6 weeks after inoculation but no blight symptoms appeared on

tomatoes throughout the season in one case and for more than 5 weeks in the other. In a third case moderate infection occurred on potatoes after 5 weeks, but only a trace on tomatoes, due possibly to spore drift from nearby tomato fields. It is concluded that if tomato blight in these cases was caused by the potato isolate its development was definitely slower than on potatoes.

2728. WALLIN, J. R.

Forecasting tomato and potato late blight in the north-central region.

From abstr. in *Phytopathology*, 1951, **41**: 37-8.

From the results of tests described it is concluded that hygrothermographs placed in the field yielded fairly accurate information on the temperature-humidity conditions associated with cyclic development of *Phytophthora infestans*, and that they can be successfully used as a basis for forecasting late-blight development.

2729. LANSADE, M.

Recherches sur la fusariose ou pourriture sèche de la pomme de terre, *Fusarium caeruleum* (Lib.) Sacc. (Fusariose or dry rot of potato.)

Ann. Épiphyt. Ser. C, 1950, **1**: 157-207, bibl. 34, illus.

The disease and the causal organism are described. Control measures advised are: Obtain tubers with thick skins by lifting the crop rather late, avoid damaging the tubers, and disinfect the storage places with cresyl, formalin or sulphurous anhydride.

2730. GRIES, G. A.

Inhibition of the potato-scab organism by soluble aluminum ions.

Abstr. in *Phytopathology*, 1951, **41**: 15.

Several strains of *Streptomyces* (*Actinomyces*) *scabies* which grow well in buffered nutrient solution at pH values as low as 4.2-4.6 have been isolated from tubers grown on mineral and muck soils in Indiana. The addition of 20 p.p.m. or more of aluminum ions as $Al_2(SO_4)_3 \cdot 18H_2O$ to the culture solution inhibits the growth of these strains below pH 5.0-5.2. Magnesium ions have no ability to antidote this aluminum toxicity. Above pH 5.2, aluminum is so insoluble that its presence is not inhibitive. It is suggested that the successful control of potato scab by soil acidification is in part due to the effect on solubility of aluminum. Muck soils in which scab developed at low pH values were found to be low in active aluminum. The addition of aluminum to organic soils for the control of scab does not appear to be practicable. [Original abstract.]

2731. OSWALD, J. W., AND WRIGHT, D. W.

Field control of potato scab in California.

From abstr. in *Phytopathology*, 1951, **41**: 29.

In Kern county, California, the application of 2,500 lb. of sulphur per acre in February, 1948, gave the following percentages of marketable tubers: in 1948, 29 (pH 4.8); in 1949, 91 (pH 3.7); in 1950, 92 (pH 4.3). Untreated plots in the same 3 years yielded 23, 12 and 26% of marketable tubers. Total yields were not significantly affected in 1948 or 1949; untreated plots yielded slightly higher in 1950. September applications of sulphur at 4 rates up to 2,500 lb. failed to control

scab the first year but produced a marked improvement in the subsequent crop, the percentage of marketable tubers increasing with the rate of application. The addition of 2 tons of lime to sulphur-treated soil with pH 4.0 raised the pH to 6.5 without any increase in scab in the subsequent crop.

2732. DOWSON, W. J., AND JONES, D. R.

Bacterial wet rot of potato tubers following *Phytophthora infestans*.

Ann. appl. Biol., 1951, **38**: 231-6, bibl. 8.

Potato tubers infected with *Phytophthora infestans* in the field produce abnormal amounts of liquid which may appear on the surface of tubers kept in a saturated atmosphere, and then a soft rot, associated with bacteria, develops. Healthy tubers artificially infected with pure cultures of *P. infestans* produce a similar liquid and, if they are then inoculated with pure cultures of certain bacteria, develop a wet rot which spreads if the bacteria are pathogenic or is confined to the fungal invasion zone if the bacteria are saprophytes. Botany School, Cambridge.

2733. LANSADE, M.

Recherches sur le flétrissement bactérien de la pomme de terre en France, *Corynebacterium sepedonicum* (S. et K.) Skapt. et Burkh. (Research on the bacterial wilt of potato in France.)

Ann. Épiphyt. Ser. C, 1950, **1**: 69-156, bibl. pp. 5, illus.

LANSADE, M.

Recherches sur le flétrissement bactérien de la pomme de terre. (An investigation on the bacterial wilt of potato.)

(Publ.) *Stat. cent. Path. vég. Versailles B.T.I.48*, 1950, pp. 12, bibl. 14, illus.

Bacterial wilt of potatoes is a vascular disease characterized by wilting of the haulms and decomposition of the tubers. On inoculation the bacterium caused wilting of potato and tuber rot, and in experiments attacked tomato and eggplant. Control measures include the selection of sound seed tubers, planting whole tubers or the disinfection of the cutting knife, and the elimination of affected plants. The second paper is an abbreviated version of the first.

Nematodes.

(See also 2864.)

2734. GRAINGER, J.

Reducing the spread of potato root eelworm.

Adv. Leaf. W. Scot. agric. Coll. **12**, [1951 ?], pp. 3.

Losses caused by the potato eelworm, *Heterodera rostochiensis*, are mentioned and the precautions to be taken to prevent its dispersal on the farm and its spread from one farm to another are outlined.

2735. SASSER, J. N., FELDMESSER, J., AND FASSULIOTIS, G.

Control of golden nematode of potatoes with an organic phosphate insecticide.

From abstr. in *Phytopathology*, 1951, **41**: 31-2.

Systox spray (E-1059), an organic phosphate insecticide, when placed in direct contact with golden nematode

(*Heterodera rostochiensis*) cysts in Petri dishes inhibited larval hatching, the period of inhibition depending on the concentration and the length of exposure. E-1065 at 0.25, 0.5, 1 and 2% in direct contact with larvae for 1 day killed 6, 6, 36 and 100% respectively, and in contact for 1 week killed 94, 99, 100 and 100% respectively. Spraying potato plants growing in infested soil with a 1% concentration did not reduce the number of new cysts.

2736. LOWNSEBURY, B. F., LOWNSEBURY, J. W., AND MAI, W. F.

Nematodes found in New York State potato fields with different cropping histories.

From abstr. in *Phytopathology*, 1951, 41: 24.

Results of a survey on fields where potatoes had been grown continuously for 20 to 30 years indicated that two species of *Pratylenchus* were the only nematodes present in quantity, and that high populations of pathogenic nematodes do not always result from continuous cropping with potatoes.

Insect pests.

(See also 2587, 3117.)

2737. CANNON, F. M.

Colorado potato beetle.

Processed Publ. Canada Dep. Agric. Div.

Ent. 92, 1951, pp. 4, illus.

Notes on economic importance, distribution, host plants, appearance of the insect, damage caused, life-history and control. DDT as a spray or dust is the most satisfactory insecticide for use against this pest

2738. BERAN, F.

Auftreten und Bekämpfung des Kartoffelkäfers in Österreich im Jahre 1950. (The appearance and control of the Colorado beetle in Austria in 1950.) [English summary ½ p.]

PflSch. Ber. Wien, 1950, 5: 359-72.

The area infested by the Colorado beetle increased from 0.4% in 1949 to 9.7% in 1950 and the quantity of insecticides used to combat it increased proportionately. The success of these control measures is shown by the absence of loss to potato crops.

2739. GLENDENNING, R., AND NEILSON, C. L.

Tuber flea beetle.

Processed Publ. Canada Dep. Agric. Div.

Ent. 96, 1951, pp. 5.

The tuber flea beetle, *Epitrix tuberis* Gent., is described, with notes on its life-history, host plants (mainly potato and tomato), injury caused, dispersal and control. Times of application and the composition of sprays or dusts based on calcium arsenate and DDT, are set out. BHC, which shows promise, is being studied, but is not yet recommended because of the risks of tainting the crop.

2740. BUREAU OF ENTOMOLOGY, U.S. DEPARTMENT OF AGRICULTURE.

Potato leafhopper.

Pict. Sheet, U.S. Dep. Agric. 8, pp. 2, illus.

The damage caused by, and the life history of, the potato leafhopper (*Empoasca fabae*) are outlined and control with 3% DDT dust is recommended.

Effects of insecticides on potatoes.

2741. JAMESON, H. R., AND TANNER, C. C.

Taint in potatoes grown on land treated with crude benzene hexachloride against wireworms.

J. Sci. Food Agric., 1951, 2: 171-5.

It is shown that the degree of taint produced in potatoes grown on land treated (worked into the soil by normal cultivation methods) with crude benzene hexachloride is a function of the amount of crude BHC applied per acre and the time elapsing after application. An equation linking degree of taint with these variables is given and summarizes data accumulated over a period of four years in numerous trials under varying soil and climatic conditions in England. Potatoes grown after treating land with 4 lb. crude benzene hexachloride per acre for control of wireworm are likely to be tainted if planting takes place within 18 months of the date of soil treatment; if planting takes place 3 years after soil treatment the crop should be free from taint. [Authors' synopsis.]—I.C.I., Jealott's Hill Research Station.

Storage and sprout inhibition.

2742. CROOK, E. M., AND WATSON, D. J.

Studies on the storage of potatoes. II. The temperature conditions inside potato clamps.*

J. agric. Sci., 1950 (issued March 1951), 40: 199-226, bibl. 4.

The temperature at the middle of a potato clamp showed a drift with time similar to that of mean air temperature. Deviations of mean air temperature from smooth trend, lasting for about a week, had no effect on the temperature of the potatoes; longer period deviations were reflected in the temperature of the potatoes after a lag of about a week. The temperature in the potatoes tended to fall from the centre of the heap towards the outside. Three effects of wind were distinguished. (1) It depressed the temperature of the potatoes at the surface of the heap towards which it was blowing. (2) The daily temperature range throughout the earth cover and in the air was reduced by wind blowing from any direction. (3) After the earth cover was removed wind greatly increased the diurnal temperature fluctuation at the surface of the potatoes on the side of the clamp towards which it was blowing, and suppressed it on the opposite side. In general, clamp storage in eastern England provides temperature conditions reasonably close to the optimum only from November to April in winters free from prolonged frosts.—Rothamsted exp. Stat.

2743. CROOK, E. M., AND WATSON, D. J.

Studies on the storage of potatoes. III.

The composition of the atmosphere in a potato clamp.

J. agric. Sci., 1950 (issued March 1951), 40: 227-32, bibl. 9.

The CO₂ concentration in the atmosphere of a potato clamp varied between 0.06 and 0.86%. The sum of CO₂ and oxygen concentrations remained approximately constant at 21%. The CO₂ concentration increased with time from December to April. Wind

* For abstract of Part I of this series, see H.A., 19: 1622.

blowing in the direction normal to the face of the clamp reduced the CO₂ concentration. A multiple regression of CO₂ concentration on temperature of the potatoes at the time of sampling, and on mean component of wind velocity normal to the clamp face, estimated over a period of 3 hrs. before the time of sampling, accounted for 64% of the variance between sampling occasions. Unsaturated compounds in the clamp atmosphere varied between 0.004 and 0.025%.—Rothamsted exp. Stat.

2744. BOYD, A. E. W.

The internal blackening of potatoes caused by bruising.

J. hort. Sci., 1951, 26: 148-56, bibl. 13, illus.

Tubers must be relatively flaccid before blackening will occur to any extent, and factors such as temperature, duration and conditions of storage which favour loss of turgidity render the tubers more susceptible to the effects of bruising. Susceptibility is greatest at the heel end and least at the rose end of the tuber. Certain varietal differences were observed, and large tubers were more susceptible than small ones. It is probable that in practice one of the common causes of blackening is the combined process of de-sprouting and riddling tubers late in the storage period. Reference is made to Dutch work showing that deficiency of potash and excessive nitrogen applications may increase susceptibility.—Dep. Agric. Scotland, Corstorphine, Edinburgh.

2745. MONTENEGRO, H. W. S.

Retardamento da brotação das batatas durante a armazenagem. (Inhibition of sprouting in stored potatoes.)

An. Esc. sup. Agric. "Luiz de Queiroz", Piracicaba, 1949, 6: 75-81 [received 1951].

Very satisfactory inhibition of sprouting was obtained in Brazil by the application of "Agermina" (1% methyl ester of alpha naphthaleneacetic acid in talc) at the rate of 28 g. per 20 kg. potatoes when dusted on the tubers 2 months after harvest; 2½ months after treatment, both the number and size of the sprouts was markedly less on the treated tubers than on the controls. When planted out, however, the treated tubers produced just over half the crop produced by the controls, and showed 2.5% more rotting, so the treatment cannot be recommended for tubers intended for seed. The optimum time of application has not yet been determined. The material proved to be harmless to the consumer.

2746. MARSHALL, E. R., AND SMITH, O.
Maleic hydrazide as a sprout inhibitor for potatoes.

Bot. Gaz., 1951, 112: 329-30, illus.

During trials at Cornell marked sprout inhibition was induced in potato tubers by the injection of maleic hydrazide whereas surface application was practically ineffective.

Noted.

2747.

a HOOKER, W. J., AND PAGE, O. T.

Potato tuber growth and scab infection.

From abstr. in *Phytopathology*, 1951, 41: 17.

b HOYMAN, W. G.

Indexing potatoes for virus X, including the use of tuber juice.

From abstr. in *Phytopathology*, 1951, 41: 18-19.

c LARSON, R. H., AND DARBY, J. F.

Variation in virulence of potato virus Y isolates from different sources.

From abstr. in *Phytopathology*, 1951, 41: 23.

d LIMASSET, P.

La sélection sanitaire, méthode de lutte contre les maladies à virus des plantes. (The selection of healthy plants, a method for controlling virus diseases of plants.)

(Publ.) *Stat. cent. Path. veg. Versailles B.T.I.49*, 1950, pp. 8, bibl. 2, illus.

Methods used in North America and England for potatoes, strawberries and dahlias.

e MAI, W. F.

***Solanum xanthii* and *S. integrifolium*, new hosts of the golden nematode, *Heterodera rostochiensis*.**

From abstr. in *Phytopathology*, 1951, 41: 24.

f NOONAN, J. B.

Soil fertility is essential to good potato yields; value of pasture swards in cropping systems.

Agric. Gaz. N.S.W., 1950, 61: 501-3.

g WAGGONER, P. E.

Gradients of potato late blight observed around artificially inoculated plants.

From abstr. in *Phytopathology*, 1951, 41: 36.

TOBACCO.

Morphology and growth.

(See also 2259, 2265, 2267, 3104, 3130.)

2748. CAMUS, G. C., AND WENT, F. W.

Thermoperiodicity of different varieties of tobacco.

Abstr. in *Amer. J. Bot.*, 1950, 37: 676-7.

Different varieties of *Nicotiana tabacum* were grown at various day and night temperatures in the Earhart Plant Research Laboratory. Growth habit, growth rate, flowering time, and final weights of the plants

were markedly affected by night temperature. Modifying day temperature only acted on the intensity of the reactions without shifting the critical night temperatures for these reactions. In a few cases the relationship between duration and quality of light was also studied. The most extensive investigation was carried out on the variety Cuba White and checks were made for the other varieties. The conclusion was reached that each variety has its characteristic optimal night temperatures for the different processes, which correlates with the findings for tomatoes.—Calif. Inst. Technology, Pasadena.

2749. CAMUS, G. C., EGGMAN, L., AND WILDMAN, S. G.

Preliminary studies of the influence of night temperature on the protoplasmic constituents of tobacco leaves.

From abstr. in *Amer. J. Bot.*, 1950, 37: 676.

Tobacco plants grown at various night temperatures show marked differences in growth rate and growth habit. Leaves taken from *Nicotiana tabacum* var. Cuba White, grown for 104 days, were analysed for cell walls, particulate proteins and soluble cytoplasmic proteins. The analyses reveal that night temperature profoundly affects not only the total amounts but also the respective proportions of these cellular constituents. With increasing night temperature, the weight of cell walls steadily increases up to 20° C. A maximum amount of particulate matter was obtained from leaves grown at a night temperature of 26° C., resulting in 225 per cent more particulate proteins than were obtained from leaves grown at 6° C., and 50 per cent more than at 30° C. There appears to be an inverse relationship between particulate proteins and soluble cytoplasmic proteins. The amount of soluble cytoplasmic proteins was minimal when the leaves were grown between 14° and 20° C. Study of the protein components comprising the soluble cytoplasmic proteins has been undertaken together with electrophoretic and nitrogen analyses. The results so far indicate that very clear interrelations occur in the synthesis of cell components and that the protein synthetic activity of the cell may be directed toward different paths by thermal treatment.—Calif. Inst. Technology, Pasadena.

2750. POLJAKOV, I. M., AND MIHAĬLOVA, P. V.
The growth of the pollen tube in different parts of the pistil and selective fertilization.
 [Russian.]
Izv. Akad. Nauk S.S.S.R. Ser. biol., 1951, No. 1, pp. 31-55, bibl. 23.

Experiments were carried out with varieties of *Nicotiana tabacum* and *N. rustica*. The pollinated plant in each case was a yellow-leaved variety and it was pollinated with a mixture of equal parts of the pollen of that variety and of one of a number of green-leaved varieties. In the various series the stigma only or half the style was cut off at different intervals after pollination. For controls the styles and stigmas were left intact. The resulting capsules were allowed to ripen, the seed germinated in petri dishes, and the progeny examined for colour of the leaves, whether yellow or green. From the relative numbers of the yellow and the green individuals in the F₁ generation the "selectiveness" of the stigma for the two sorts of pollen in the pollen mixture was estimated. The implications of the results are discussed.

Cultivation and nutrition.

(See also 3104.)

2751. CURCIO, M.
 La concimazione del tabacco. (**Manuring tobacco.**)
Tabacco, 1950, 54: 268-72, 297-303, 333-40, 361-9, and 1951, 55: 26-34, 73-80, bibl. 40.
 The manuring of tobacco is discussed in detail under

the following headings: 1. An account of tobacco-growing in Italy. 2. The botanical classification of tobacco in relation to industrial types. 3. Manuring the seed-bed. 4. The requirements of strong tobaccos with particular reference to fertilizers (organic, mineral and catalytic). 5. Manuring mild tobaccos. 6. Manuring tobaccos for high grade cigars; their special requirements. 7. Manuring of levantine and oriental tobaccos. 8. Manuring snuff tobaccos.

2752. McEVoy, E. T.
The physiological aspect of major element nutrition on the maturity of flue-cured tobacco.

Sci. Agric., 1951, 31: 85-92, bibl. 3.

The effect of N, P and K on the maturity and composition of flue-cured tobacco grown in sand culture was investigated at Ottawa. Given complete nutrients until topped, the plants were thereafter found to respond noticeably to variations in treatment. Maturity was accelerated by reduction of N but delayed by reduction of P and K. Reserves of N and K at topping time were inadequate for normal growth, while reserves of P were adequate for this but not for ripening of the leaves. The effects of variation in nutrient supply on the N, P, K, Mg, Ca and S contents of the leaves are also reported.

2753. DELWICHE, C. C.
The assimilation of ammonium and nitrate ions by tobacco plants.
J. biol. Chem., 1951, 189: 167-75, bibl. 10.

Data are presented which give a measure of the rate of assimilation of ammonium and nitrate ions by tobacco leaves. Rates in the light and in the dark are compared. The incorporation of labeled nitrogen from nitrate into other nitrogenous fractions takes place readily in the dark as well as in the light. The exchange of labeled nitrogen from these two sources for the nitrogen of amino acids and proteins was clearly evident in every case. When substrate isotopic nitrogen was in the form of ammonium ion, no isotopic nitrogen was found in the nitrate fraction. [Author's summary.]—Univ. Calif., Berkeley.

2754. STEINBERG, R. A.
Influence of acidity, calcium and magnesium on growth of Xanthi tobacco in water-culture.
Plant Physiol., 1951, 26: 37-44, bibl. 5.

These water-culture experiments are a repetition in the greenhouse of aseptic-culture experiments reported in 1947 [see H.A., 18: 428] dealing with the effects of acidity on the Ca and Mg requirements of oriental Xanthi tobacco. The solutions had initial reactions of pH 4.6 and 7.0. No difficulty was experienced with iron nutrition if the solutions were vigorously stirred twice a week so that the roots became covered with a heavy coating of the precipitated iron, phosphate, etc. The relative freedom from toxic quantities of trace element impurities was also conducive to good iron nutrition. No statistically significant differences were found in the values for Mg and Ca requirements at the 2 levels of acidity, although there were indications of a definite trend towards larger yields with increased acidity in the Mg series, and towards smaller yields in the Ca series.—Plant Industry Station, Beltsville, Md.

2755. BERTOSSI, F.

Primi risultati di esperienze con soluzioni a base di vitamina B₁ su semenzai di tabacco Burley. (Preliminary results of experiments with solutions of vitamin B₁ in tobacco seedbeds.)

Tabacco, 1950, 54: 278-83, bibl. 19.

From the results recorded it was concluded that, in general, vitamin B₁ had no direct effect on the growth of tobacco plants in the seedbeds. It had, however, a favourable effect on mineral assimilation and so indirectly favours growth and improved leaf colour.

2756. LAUMONT, P., AND LAFOND, J. A.

L'établissement et la protection des planches à semis: la stérilisation du terreau dans la culture du tabac en Algérie. (Preparing tobacco seed beds in Algeria and the sterilization of the soil.)

Ann. Inst. agric. Algér., 1950, 5: 4: 1-24, illus.

In a favourable year there is no consistent difference in the development and regularity of growth in cold or in slightly warmed tobacco seed beds, but the latter are preferable in that they minimize temperature variation, particularly when the seeds are unprotected. The sterilization of the beds, by the method described, gives good results. Satisfactory development was obtained in plastic "Vitrex" glass frames.

2757. BERTOSSI, F.

Trattamenti con sostanze auxiniche e auxinosimili di piantule del tabacco in rapporto allo "shock da trapianto". (Applying auxins and similar substances to tobacco seedlings in relation to transplantation "shock".)

Tabacco, 1950, 54: 354-60, bibl. 3.

All the substances tried proved to be ineffective in reducing the mortality of tobacco seedlings following transplanting.

2758. PANELLA, A.

Indagini preliminari sull'uso del 2,4-D come regolatore dello sviluppo dopo la cimatura del tabacco. (Preliminary investigations on the use of 2,4-D to control the development of tobacco after topping.)

Tabacco, 1950, 54: 243-51, bibl. 7, illus.

The use of 2,4-D to regulate growth after topping Kentucky tobacco caused some reduction in the number and weight of suckers subsequently removed. This favoured an increase in the weight of green leaves produced, but caused deterioration in the quality of the crop.—Perugia Univ.

Composition.

(See also 2257.)

2759. MOTHES, K., AND ROMEIKE, A.

Über die Anhäufung von Alkaloiden in Organen der Speicherung und Reproduktion. (The accumulation of alkaloids in organs of storage and reproduction.)

Biol. Zbl., 1951, 70: 97-113, bibl. 31.

(1) All seeds of *Nicotiana rustica* contain nicotine, some of them in considerable quantity. (2) Whereas the

alkaloid content of the seeds of the *N. tabacum* varieties examined decreases during maturation, that of *N. rustica* and *Datura* suddenly rises during the last phase of ripening, this rise being accompanied by a decrease in the alkaloid content of the seed capsules. (3) In half-mature *N. rustica* fruits detached from the parent plant the alkaloid disappears during slow after-ripening, without significantly increasing the alkaloid content of the seeds. Detached seeds of *Datura* show a distinct increase in alkaloids during after-ripening. (4) Young leaves, shoots and fruits of *Datura* scions on tomato roots contain considerable, though sub-normal, amounts of alkaloid, only a small proportion of which is atropine. Similarly, the fruits of *N. rustica* on tomato roots contain alkaloids, principally nicotine. (5) Hence, alkaloids are synthesized in fruits and seeds, but neither their normal quantity nor quality is attained if these organs ripen detached from the plant or if they develop over the root of another species. (6) The translocation of alkaloid from the leaves of *Nicotiana* and *Datura* is inconsiderable. (7) This is in agreement with the observation that tomato fruits and potato tubers developing on alkaloid-forming roots contain alkaloid in distinct, though relatively small amounts as compared with transpiring leaves. Alkaloids injected into tomato fruits are not decomposed to any marked extent. (8) At present the very high alkaloid content of seeds and fruits can be explained only by synthesis, although the concentration occurring under special experimental conditions is not yet fully understood. [Translation of authors' summary.]—Inst. f. Kulturpflanzenforschung, Gatersleben.

2760. TRACEY, M. V.

Cellulase from leaves and roots of tobacco.

Biochem. J., 1950, 47: 431-3, bibl. 8.

An enzyme that can depolymerize sodium carboxymethylcellulose, and split reprecipitated cellulose has been found in tobacco plants. The enzyme, which is similar in properties to animal and fungal cellulases, is present in very low concentrations. [From author's summary.]—Rothamsted exp. Stat.

2761. PIRIE, N. W.

The isolation from normal tobacco leaves of nucleoprotein with some similarity to plant viruses.

Biochem. J., 1950, 47: 614-25, bibl. 24.

A nucleoprotein, prepared from the sap of young, uninfected tobacco leaves by ultracentrifugation at Rothamsted, was found to be unstable *in vitro* and autolysed in a few hours at 38° C., yielding denatured protein and either nucleotides or nucleosides depending on the duration of hydrolysis. The denatured protein still retained some of the sap enzymes. It is not considered to be a precursor of the plant viruses.

2762. HOLDEN, M., PIRIE, N. W., AND TRACEY, M. V.

A study of enzymes that can break down tobacco-leaf components. I. Digestive juice of *Helix* on leaf fibre.

Biochem. J., 1950, 47: 399-407, bibl. 33.

1. The effect of the polysaccharidases of *Helix* digestive juice on tobacco-leaf fibre has been investigated. 2. Various pre-treatments of the fibre modify the action of these enzymes. 90% of the carbohydrate of the

fibre can be brought into solution. The nature of the insoluble residue is discussed. 3. Cellulase and polygalacturonase are principally concerned in this digestion. The action of the latter is favoured by preliminary decalcification of the fibre. 4. Snail digestive juice has little action on the green "chloroplast" fraction of sap sediment. 5. The merits of disintegrating leaves enzymically are considered, but the fact that release by a specific enzyme does not give unequivocal evidence about the original linkage of a substance is recognized. [Authors' summary.]—Rothamsted exp. Stat.

2763. HOLDEN, M., AND TRACEY, M. V.

A study of enzymes that can break down tobacco-leaf components. 2. Digestive juice of *Helix* on defined substrates.

Biochem. J., 1950, **47**: 407-14, bibl. 74.

1. The action of snail digestive juice on cellulose (cellophan) and on pectic acid has been investigated. 2. A number of other polysaccharides and polysaccharide derivatives have been tested as substrates for snail digestive juice. Hyaluronic acid, alginic acid, a dextran from *Betacoccus arabinosaceus* (*Leuconostoc mesenteroides*), galactogen from *Helix aspersa* and nitrocellulose were not affected, while irisin, yeast glucan, a levan from grass, a bacterial levan, methylcellulose, ethylmethylcellulose, and carboxymethylcellulose were attacked. [From authors' summary.]—Rothamsted exp. Stat.

2764. HOLDEN, M.

A study of enzymes that can break down tobacco-leaf components. 3. Fungal polygalacturonase on leaf fibre.

Biochem. J., 1950, **47**: 415-20, bibl. 28.

1. Tobacco-leaf fibre incubated at pH 4.5 several times with fresh lots of purified polygalacturonase loses about half of its polyuronide. 2. Milling the fibre increases the rate of release of carbohydrate from fibre with polygalacturonase and also increases slightly the total amount liberated. 3. Decalcification of the fibre by cation exchange with concentrated salt solutions, and by extraction with acid, increases the rate of liberation of carbohydrate by polygalacturonase, up to 95% of the polyuronide present being released. 4. Sodium chloride in concentrations greater than 0.05 M. inhibits the action of polygalacturonase on fibre, but concentrations less than 0.01 M. activate. Calcium chloride is inhibitory, except in concentrations below about 0.001 M. when using decalcified fibre. [Author's summary.]—Rothamsted exp. Stat.

2765. HOLDEN, M., AND TRACEY, M. V.

A study of enzymes that can break down tobacco-leaf components. 4. Mammalian pancreatic and salivary enzymes.

Biochem. J., 1950, **47**: 421-5, bibl. 9.

1. All starch can be removed from tobacco-leaf fibre by incubation with salivary amylase. 2. All starch and about 80% of the total nitrogen can be removed from tobacco-leaf fibre by incubation with commercial trypsin. 3. Incubation of the fibre with commercial trypsin leads to a loss of chloroform-soluble material. 4. Figures are given for the composition of the particulate matter, chiefly chloroplasts, in crude tobacco-leaf saps. 5. The nature of the nitrogenous substances of the fibre is discussed. [Authors' summary.]—Rothamsted exp. Stat.

2766. HOLDEN, M.

A study of enzymes that can break down tobacco-leaf components. 5. Unfractionated fungal enzymes.

Biochem. J., 1950, **47**: 426-31, bibl. 21.

1. The effects on tobacco-leaf fibre of some enzyme preparations of fungal origin have been investigated and compared with those of snail digestive juice. 2. The enzymic activities of the preparations on a number of polysaccharides (cellulose, pectic acid, starch and inulin) and on haemoglobin and gelatin were determined. [Author's summary.]—Rothamsted exp. Stat.

Diseases.

(See also 2437, 2583, 2843.)

2767. CLAYTON, E. E., AND McMURTREY, J. E., JR.
Tobacco diseases and their control.

Fmrs' Bull. U.S. Dep. Agric. **2023**, 1950, pp. 70, illus.

Tobacco diseases are described under: Development and control of tobacco diseases; losses from tobacco diseases; general control measures; disease-resistant varieties; plant-bed diseases; leaf diseases in the field; virus diseases; stalk and root diseases; disease damage during curing; injuries associated with weather and soil conditions; and malnutritional diseases. There are keys to the identification of the major diseases and malnutritional disorders.

2768. MENEGHINI, M., AND DELWICHE, C. C.

The multiplication of tobacco mosaic virus in the host tobacco plant.

J. biol. Chem., 1951, **189**: 177-86, bibl. 16.

(1) It is concluded that, in the host tobacco plant, TMV is formed from some nitrogenous compound or compounds (such as amino acids) which undergo a more rapid exchange of nitrogen with ammonium ion than does the extractable protein of the cell. (2) It is further concluded that, at least after infection has run its course in the plant, the virus behaves as a foreign protein which is not in dynamic equilibrium with other cell constituents. (3) Evidence is cited which strongly suggests that the process of virus formation in the host plant is virtually an irreversible one. [Authors' summary.]—Univ. Calif., Berkeley.

2769. FULTON, R. W.

The reinfection of mosaic leaves of *Nicotiana sylvestris* by other strains of tobacco-mosaic virus.

From abstr. in *Phytopathology*, 1951, **41**: 13.

From the results of inoculation tests on leaves of *N. sylvestris* it was concluded that necrotic-type strains of mosaic virus were able to enter and multiply in cells containing a low concentration of another strain of the same virus.

2770. STAHMANN, M. A., AND OTHERS.

The inhibition of tobacco mosaic virus by synthetic lysine polypeptides.

J. biol. Chem., 1951, **189**: 45-52, bibl. 26.

The reversible inhibition of the infectivity of tobacco mosaic virus by some high molecular weight synthetic lysine polypeptides is reported. The preparation of a synthetic lysine polypeptide is described. A possible

mechanism for the inhibition of virus infectivity by the lysine polypeptides is discussed. [Authors' summary.] —Univ. Wisconsin.

2771. BENDA, G. T. A.

Masking and recovery in the ringspot No. 1 virus disease of Turkish tobacco.

From abstr. in *Amer. J. Bot.*, 1950, 37: 676.

After inoculation with the ringspot virus, the inoculated and some younger leaves show symptoms, but the youngest leaves and all the future leaves will show no symptoms although they contain considerable virus. These are the "recovered" leaves. The results of grafting experiments indicated that the stem and root contribute little to recovery, and that the mechanism involved in recovery occurs independently in each leaf. It was shown that symptom formation is not a necessary concomitant for the spread of virus through leaf tissues. It appeared that symptoms result from growth tensions of non-infected areas against the metabolically disturbed, contemporaneously infected areas, and that symptoms are absent in the recovered phase because of the elimination of these tensions due to systematic infection.—Yale Univ., New Haven, Conn.

2772. VALLEAU, W. D.

Tobacco ring-spot virus: the cause of eggplant yellows.

Phytopathology, 1951, 41: 209-12, bibl. 6.

It was found that the yellowed eggplant contained tobacco ring-spot virus, which would produce typical ring-spot symptoms and cause pollen sterility in burley tobacco.—Ky agric. Exp. Stat.

2773. KOEK, P. C.

Een voor Nederland nieuw tabaksziekte veroorzaakt door *Fusarium oxysporum* var. *nicotianae*. (A tobacco disease, new to Holland, caused by *Fusarium oxysporum* var. *nicotianae*.) [English summary $\frac{1}{2}$ p.] *Meded. Dir. Tuinb.*, 1950, 13: 895-900, bibl. 7, illus.

A wilt of the Havana Connecticut variety of tobacco is attributed to *Fusarium oxysporum* var. *nicotianae*, a fungus not previously recorded in Holland. Control methods include growing resistant varieties, avoiding contaminated soil and the use of healthy seedlings.

2774. IVANOVSKIĬ, D. I.

Two diseases of tobacco. [Russian.]

Izv. Akad. Nauk S.S.S.R. Ser. Biol., 1950, No. 6, pp. 30-41, bibl. 3.

The two diseases described are powdery mildew (*Oidium tabaci*) and mosaic disease. Control of powdery mildew by flowers of sulphur is considered to be impracticable because the tobacco prepared from sulphured leaves retains the sulphurous odour.

2775. STOVER, R. H.

Black rootrot of tobacco in Ontario and factors relating to its control.

Plant Dis. Repr., 1950, 34: 387-91, bibl. 7, illus.

In addition to resistant varieties and crop rotations, preliminary experiments indicate that certain soil fumigants (e.g. Dowfume H-90) offer some promise for

the control of black rootrot (*Thielaviopsis basicola*) of tobacco in Ontario.

2776. DIACHUN, S., AND TROUTMAN, J.

Multiplication of *Bacterium tabacum* in leaves of *Nicotiana longiflora*.

From abstr. in *Phytopathology*, 1951, 41: 10.

Bacterium tabacum causes wildfire in commercial tobacco. In inoculation tests with *N. longiflora* the number of bacteria increased during the first few days but did not reach the high levels present in burley. After a few days the number of bacteria present declined. No symptoms developed in *N. longiflora*.

2777. CLAYTON, E. E., AND OTHERS.

Breeding behavior and growth responses resulting from the transfer of wildfire resistance from *Nicotiana longiflora* to *N. tabacum*.

From abstr. in *Phytopathology*, 1951, 41: 7.

Hybridization studies are described in which *Nicotiana longiflora* was used to provide wildfire resistance. Extensive field studies have shown that wildfire-resistant lines compared with susceptible check varieties in the absence of disease damage tend to yield slightly more and to grade out slightly better. There seems to be a relationship between resistance and reduced nicotine content. Thus the nicotine content for a group of resistant lines ranged from 1.83 to 2.88% compared with 3.60 to 4.23% for commercial tobacco used as controls.

2778. CIFERRI, R., AND MARCELLI, E.

Azione tossica di una zeolite mercurica sui germinelli di tabacco. (The toxic action of a mercury zeolite on tobacco sprouts.) *Tabacco*, 1951, 55: 58-63, bibl. 7, illus.

A mercury zeolite, tried experimentally for disinfecting tobacco seeds, proved toxic to the sprouts. Absorption of the cations caused lesions in the phloem.

Insect pests and nematodes.

2779. TURNER, N.

Control of tobacco insects.

Circ. Conn. agric. Exp. Stat. 179, 1950, pp. 16, illus.

Insects causing injuries to tobacco are described and control measures recommended. A key to the damage caused by the pests, with brief descriptions of the injury to aid in identification is given.

2780. CHAMBERLIN, F. S.

Insecticidal control of aphids and other insects on shade-grown tobacco.

J. econ. Ent., 1950, 43: 640-1, bibl. 4.

In trials carried out at Quincy, Florida, a dust containing 1% parathion plus 10% DDT applied weekly effectively controlled aphids, mainly *Myzus persicae*, on shade-grown tobacco, and eliminated damage by the granulate cutworm, *Feltia subterranea*. It was also observed that the treated plants suffered no injury from tobacco flea beetle, *Epitrix hirtipennis*, and garden fleahopper, *Halticus bracteatus*; a heavy infestation by tobacco hornworm, *Protoparce sexta*, however, was not controlled.

2781. ANDERSON, P. J., AND SWANBACK, T. R.
Fumigation of tobacco soils in the seedbed and in the field.

Bull. Conn. agric. Exp. Stat. 542, 1951, pp. 23, bibl. in text, illus.

The use of methyl bromide, chloropicrin, formaldehyde and acetic acid in tobacco seedbeds is described, and the fumigation of field soils is discussed.

2782. SASSER, J. N.

Population dynamics of nematode parasites of tobacco in certain crop rotations.

From abstr. in *Phytopathology*, 1951, 41: 31.

Population studies of root-knot (*Meloidogyne incognita*) and meadow nematode (*Pratylenchus* sp.) were made on 2-year rotation plots of cotton-tobacco, corn-tobacco, peanuts-tobacco, weeds-tobacco, oats-weeds-tobacco, and tobacco-tobacco. Both root-knot and meadow nematode populations fluctuated widely. Root-knot populations increased to about the same extent in both tobacco and corn plots. Where peanuts followed tobacco a high root-knot nematode population was reduced to a trace. Where tobacco followed peanuts the population built up again. In cotton-tobacco plots root-knot nematodes were more abundant after cotton than after tobacco. There were very abundant populations of meadow nematodes after corn and cotton, moderate populations after tobacco and low populations after peanuts, weeds and oats-weeds.

2783. GRAHAM, T. W., AND HOLDEMAN, Q. L.
Nematode injury to tobacco, cotton, and corn in relation to populations of root-knot and meadow nematodes.

From abstr. in *Phytopathology*, 1951, 41: 14.

In studies on root-knot, caused by *Meloidogyne* spp., and nematode root rot, caused by *Pratylenchus* spp., root injury and nematode populations were recorded at frequent intervals throughout 2 growing seasons. In certain plots fumigated with DD and ethylene dibromide root-knot was reduced more than root rot.

2784. GABEL, J. L., AND MIDDELBURG, H. A.
Bestrijding van de "dikbuik"-ziekte van de tabak. (Control of the tobacco stem borer.) [English summary 3 lines.]

Bergcultures, 1950, 19: 125-33, bibl. 7.

An account of the incidence and biology of the tobacco stem borer (*Gnorimoschema* (*Phthorimaea*) *heliopa* Low.) in Indonesia is followed by a review of the various cultural measures recommended for its control and a summary of experiments carried out at the C.P.V. Research Station, Djember, on chemical control. BHC in the form of Hexyclan was ineffective against larvae that had already entered the plants. In laboratory trials derris (0.05% rotenone) sprays gave as good control as 0.05% DDT sprays. In seedbed trials Gesarol (0.05% DDT) sprays, Ditrene (0.05% DDT) sprays and Gesarol (5% DDT) dusts all gave good control of the borer. DDT appeared preferable to derris on account of its longer residual action. Detailed recommendations are made to the grower.

2785. VAN DER LAAN, P. A.

Bestrijding van de dikbuikmot van de tabak met derris. (Control of the tobacco stem borer with derris.) [English summary 1 p.] *Landbouw*, 1950, 22: 258-66, bibl. 7, and *Bergcultures*, 1950, 19: 235-41, 252.

The tobacco stem borer (*Phthorimaea heliopa*) is a minor pest of tobacco in Deli, Sumatra, but causes serious damage in parts of central and eastern Java. The caterpillars feed on the stems, leaves and petioles, and the growth of attacked plants, especially young plants, is considerably retarded. The older larvae remain inside the tissue of the plant but the young larvae are often found crawling on the leaves. In experiments carried out in seedbeds and in the field, the young larvae were killed by applications of derris dust (1% rotenone) or by derris sprays (0.5% suspension of derris dust). Pyrethrum gave inferior control. The insecticides had no repellent effect on the moths. As a preventive measure, dusting the seedbeds every other day with derris (1% rotenone) at the rate of 5-15 g. per sq. m. is recommended, and dusting the young plants in the field at the rate of 0.3-1.0 g. per plant.

2786. ROSILLO, M. A.

Estudio preliminar a la bioecología del gusano minador del tallo. (A preliminary bioecological study of the [tobacco] stem miner.)

From abstr. in *Bol. inf. Colombia*, 1950, No. 8, pp. 13-14.

The stem miner, *Faustinus cubae*, attacks mainly solanaceous plants, the most important being potatoes, tobacco, tomatoes and capsicums. Minor host plants belonging to other families are named. The biology of the pest and the damage it causes are described. Trials were carried out on control by the use of poison baits, and it was found that baits containing 4% Gesarol (20% DDT) were very effective. 8% Kryocide (a product containing sodium fluoaluminate) also gave good control but had no contact toxicity. Watering the plants in the nursery with a solution of Gesarol gave fair protection. Other control measures recommended are destruction of weed hosts, destruction of crop residues, deep ploughing and crop rotation.

2787. CARLONI, M.

L'*Ephestia elutella* (Tignola o tarma del tabacco). (The tobacco moth.)

Tabacco, 1950, 54: 321-6, bibl. 8.

The morphology of *Ephestia elutella*, its biology, distribution, and control (preventive, physical, chemical and mechanical control measures) are described.

2788. BUDETTA, P.

Un minaccioso nemico del tabacco: *Phthorimaea operculella* (Zeller) o tignola della patata. (A tobacco pest: *Phthorimaea operculella* (Zeller) the potato moth.) *Tabacco*, 1950, 54: 284-96, bibl. 10, illus.

The potato moth caused great damage to tobacco in the Compartment of Benevento, Italy, in 1949. The stages in its life-history, its biology, generations, and damage caused are described, and biological control, disinfection of storage rooms and field control by DDT are discussed.

2789. GILMORE, J. U.

The suckfly on tobacco—suggestions for control.

[Publ.] *U.S. Dep. Agric. EC-15*, pp. 6, illus.

Dust mixtures containing parathion or toxaphene and sprays containing parathion or tetraethyl pyrophosphate have been found effective in the control of tobacco

suckfly. Precautions to be taken when using parathion and tetraethyl pyrophosphate are emphasized.

Harvesting and processing.

2790. VAN ROOYEN, C. F., AND PEENS, J. F.
Harvesting and curing Orinoco tobacco.
Fmg S. Afr., 1951, 26: 43-4.

The correct stage of ripeness and the curing process are described. Useful hints for the beginner include advice on treatment in the curing barn, and the maintenance of correct temperatures.

2791. VAN ROOYEN, C. F., AND PEENS, J. F.
Air-curing of tobacco and handling of the cured leaf.
Fmg S. Afr., 1951, 26: 78-9.

Advice is given on harvesting dark tobacco, drying the leaf and whole plant, and the handling of the cured tobacco.

Noted.

2792.
a HOLDEMAN, Q. L.
Tobacco stem rot of transplants and barn rot caused by *Pythium aphanidermatum*.
From abstr. in *Phytopathology*, 1951, 41: 17.

MISCELLANEOUS TEMPERATE AND TROPICAL CROPS.

Drug plants.

(See also 3832b, i, n.)

2793. ŠANTAVÝ, F.
Isolation of new substances from the flowers and pericarps of meadow saffron (*Colchicum autumnale* L.). Colchicum compounds and their derivatives. 13th communication.
Coll. Czech. chem. Commun., 1950, 15: 552-69, bibl. 19.

The following compounds were isolated from the flowers of meadow saffron (*Colchicum autumnale* L.): colchicine, compound I, compound D, compound F and compound E₁. Compound D gives compound I on methylation with diazomethane. Both compound I and D give oximes. Compound E₁ yields colchicine on methylation with diazomethane. Acetyl derivatives of compounds D and E₁ were prepared. By the same method, colchicine and compound E₂ were isolated from the pericarps of meadow saffron. Compound E₂ gave colchicine on treatment with diazomethane. [Author's summary.]—Med. Fac. Palacký Univ., Olomouc, Czechoslovakia.

2794. THOMAS, C. A.
Anthracnose of digitalis.
From abstr. in *Phytopathology*, 1951, 41: 35.

A serious disease of *Digitalis lanata* has been observed in Pennsylvania in recent years. The causal organism, identified as *Colletotrichum fuscum* Laub., was found to be seed-borne, to cause damping-off of seedlings and to be easily spread in the seed bed. Observations of isolated plantings indicated that the disease could be effectively controlled by starting with clean seed. Hot water at 55° C. for 15 min. gave complete control of the organisms on the seed and was more satisfactory than several chemicals. All species of *Digitalis* tested were susceptible. In field plots *D. purpurea*, the commercial source of digitalis in the U.S.A., *D. ambigua*

- b HOLMES, F. O.
Indications of a New-World origin of tobacco-mosaic virus.
From abstr. in *Phytopathology*, 1951, 41: 17.
- c JOHNSON, J.
Virus particles in various plant species and tissues.
Phytopathology, 1951, 41: 78-93, bibl. 15, illus.
- d SHARP, D. G., AND WOLF, F. A.
The virus of tobacco leaf curl. II.
Phytopathology, 1951, 41: 94-8.
- e STOVER, R. H.
Physiological specialization and mutations in *Thielaviopsis basicola*.
From abstr. in *Phytopathology*, 1951, 41: 34.
On tobacco and legumes.
- f STOVER, R. H.
Some methods and problems in the study of nematode root rot of tobacco in Ontario.
From abstr. in *Phytopathology*, 1951, 41: 34.

and *D. sibirica* were considerably less susceptible than *D. lanata* or *D. ferruginea*.

2795. BALDWIN, J. T., Jr.
Cytogeography of *Strophanthus* in West Africa.

Abstr. in *Amer. J. Bot.*, 1950, 37: 660.

Geographic and ecological occurrence, habit, and chromosomes of the several species of *Strophanthus* in West Africa are discussed.—College of William and Mary, Williamsburg, Va.

2796. SCHNELL, R.
Notes et observations sur divers *Strophanthus* d'Afrique occidentale. (Notes and observations on certain *Strophanthus* spp. of West Africa.)

Rev. int. Bot. appl., 1950, 30: 588-603, illus.

Observations made in French Guinea and the Ivory Coast from 1942 to 1950 are described, with notes on *Strophanthus sarmentosus*, *S. hispidus*, *S. preussii*, *S. barkeri*, and *S. gratus*, their biology, morphology, flowering, fruiting, variation, local names and uses.

2797. MONACHINO, J.
Cortisone.

J. N. Y. bot. Gdn, 1950, 51, p. 25 and p. 233, from abstr. in *Econ. Bot.*, 1951, 5: 97-8.

Recently a glucoside, sarmentogenin, from which cortisone can be prepared, was found in the seeds of a species of *Strophanthus*. There has been considerable confusion as to the exact species from which the first sample of sarmentogenin was extracted, but investigations of many species have now shown that *S. courmonti* and *S. gerrardii* can yield appreciable amounts. C.W.S.H.

2798. CHEVALIER, A.
Les *Strophanthus* comme plantes toxiques spécialement dans les savanes de l'Afrique occidentale. (*Strophanthus* spp., toxic plants of West Africa.)

Rev. int. Bot. appl., 1950, 30: 578-88.

An account of *Strophanthus sarmentosus* and *S. hispidus* and their toxic principle, formerly used by the natives of tropical Africa for poisoning arrows. *S. hispidus* is cultivated on a small scale for domestic use against parasites, and for medicinal purposes.

2799. DIJKMAN, M. J.

A commercial method for the propagation of *Strophanthus sarmentosus* A.P.D.C.

Amer. J. Bot., 1950, 37: 623-8, bibl. 17, illus.

The possibility has been suggested of growing *Strophanthus sarmentosus*, the seeds of which are used in the production of the anti-arthritis drug cortisone, as a new drug plant in Florida. Although the vine grows vigorously and flowers regularly in that state, seed-bearing fruit is rarely produced. As a first step in cultivation experiments to determine conditions under which *Strophanthus* could be brought to regular seeding, methods of large-scale vegetative propagation were studied. It was found that 2-3 node leafy cuttings from the brown, brown-green and green parts of the branches may be propagated readily in open-air beds screened against insects by keeping them under a fine water spray or mist until axillary buds show activity. Irrigation should then be reduced to a minimum until flush growth has set in, after which the cuttings should be potted up and placed in light shade until well established. During the summer the plants may be planted in open soil and will become sufficiently hardened to stand the Florida winter. It is considered possible that 1-node or even leaf-bud cuttings from the brown and brown-green portions of the stems, when propagated at the proper season, may also become useful planting material.—Miami Univ., Florida.

Essential oils.

(See also 2832a, f.)

2800. NELSON, R.

Control of mint rust with dust fungicides.

From abstr. in *Phytopathology*, 1951, 41: 27-8.

Under severe rust conditions in 1950, Fermate gave protection to Scotch spearmint much superior to that of other materials. A 2% actidione dust and tribasic copper sulphate-zinc, although less effective than Fermate, are likely to prove most useful in mint pest control, because they do not break down and leave undesirable residues in the distilled oil.

2801. BARTON, G.

Attar of roses.

Gdnrs' Chron. Amer., 1949, 53, p. 35, from abstr. in *Econ. Bot.*, 1951, 5: 81.

The perfume comes mainly from *Rosa damascena* planted in hedges 6 feet apart in Bulgaria. Only one kilo of attar is obtained from a hectare. Some attar is also produced in France, Germany and Persia.

C.W.S.H.

Fibres.

(See also 2832e, p.)

2802. CHITTENDEN, A. E., AND COOMBER, H. E.

Nipah palm petioles from Sarawak.

Colon. Plant Anim. Prod., 1950, 1: 222-30, illus.

From the results of paper-making trials with three samples of nipah petioles it was concluded that the chief difficulty was the presence of large quantities of

non-fibrous tissue. Consumption of chemicals was heavy, the yield was low and the paper a dark colour. Production would not be practicable unless a method were devised for removing the parenchymatous tissue mechanically.

C.W.S.H.

2803. HADIWIDJAJA, T.

Geval van witbontheid bij *Boehmeria nivea*.

(A case of variegation in ramie.)

Landbouw, 1950, 22: 416-17.

Occasional variegated plants have often been observed in fields of ramie. The young leaves of affected plants are pale yellow, while the old leaves show green spots. Sap inoculation and grafting experiments showed that the trouble was not caused by a virus or by a mineral deficiency.

Gums and resins.

(See also 2832o.)

2804. COTT, J. E.

Carob or St. John's bread.

Econ. Bot., 1951, 5: 82-96, bibl. 22, illus.

A full description is given of the carob tree, *Ceratonia siliqua* L., with particular reference to its possible use in California for planting in semi-arid areas which have been ruined by erosion. In such areas erosion could be controlled by proper cultivation, and a good return could be expected from carob trees grown with little or no irrigation. A 4-acre demonstration plot has recently been planted at San Diego where the average rainfall is 17 inches. It is not thought that the tree could be grown in areas with less than 12-14 in. rainfall or where the ripening season (September to October) is wet or foggy. The best varieties are being imported from the Mediterranean. In California the Bolser carob is the most promising. It has been estimated from the yield of roadside trees that a plantation with 35 trees planted per acre might give over 8,000 lb. of pods. The rodent *Geomys bursarius* (the pocket gopher) is the main pest, attacking the roots. The pods are used for stock feed and to a limited extent for human food, and a subsidiary product is the carob gum, manogalactan, which has many industrial uses.

C.W.S.H.

2805. ISLIP, H. T., AND MATTHEWS, W. S. A.

Slash pine oleo-resin from British Honduras.

Colon. Plant Anim. Prod., 1950, 1: 217-22, bibl. 1.

A satisfactory sample of oleo-resin was obtained from slash pine trees (*Pinus caribaea*). The samples of turpentine and rosin obtained from this were of normal quality. Some trees did not run freely, while others gave no gum. Those of 12-14 in. diameter gave higher yields than bigger trees. It is suggested that cultivation and tapping be carried out by American methods.

C.W.S.H.

Herbs and condiments.

(See also 2800.)

2806. CHEVALIER, A.

Sur une plante condimentaire cultivée par les Sahariens et les noirs en Afrique centrale: L'aneth ou dill (*Anethum graveolens* L.). (Dill: a herb cultivated by the inhabitants of the Sahara and the negroes in Central Africa.)

Rev. int. Bot. appl., 1950, 30: 527-8.

A description of dill and its cultivation, in watered or irrigated gardens, by the natives of tropical Africa.

2807. JANSON, B. F.

A new disease of dill.

From abstr. in *Phytopathology*, 1951, 41: 19.

For the past two years a destructive root rot and wilt of dill (*Anethum graveolens*) has been present in Ohio where dill is grown in the same soil for several years. Plants are susceptible at all ages, but young seedlings are most susceptible and when infected suddenly wilt and die. A species of *Fusarium* was consistently isolated from the roots and lower stem of diseased plants. Steam sterilization of infested soil successfully controlled the disease, but seed treatment with various commercial compounds did not.

2808. SCARAMUZZI, F.

Il miglioramento delle razze orticole di finocchio dolce. Ricerche sulla biologia florale. (Improving the varieties of cultivated fennel: its floral biology.) [English summary 12 lines.] *Riv. Ortoflorofruttic. ital.*, 1951, 35: 19-27, bibl. 12, illus.

The cultivated varieties of fennel are self-fertile and inter-fertile and may be pollinated from different botanical varieties of *Foeniculum vulgare*. The degeneration of fennel in Italy is a result of the proximity of strains extraneous to those selected for reproduction. Seed plots of a selected strain must be kept isolated from other varieties.

2809. BEMFIELD, E.

Ginger.

Perf. & ess. Oil Rec., 1950, 41, p. 136, from abstr. in *Econ. Bot.*, 1951, 5: 59.

The main sources of ginger are Jamaica, India and West Africa. It is marketed as dried rhizomes, scraped ginger, or rhizomes treated with sulphurous acid or chlorine and dusted with lime. Jamaica ginger is of the best quality from the point of view of aroma, but West African and Indian ginger give the highest yield of oleo-resin. C.W.S.H.

2810. FILENI, E.

Tipiche coltivazioni italiane. (Three typical Italian crops.)

Humus, 1951, 7: 3: 24-6, illus.

Notes are given on three crops typical of the Carmagnola district (Turin province, northern Italy), viz. hemp, mint (*Mentha commune*) and chillies.

2811. ŽDANOV, L. A.

Increasing the yield and oil production of the Chinese mustard (*Brassica juncea* (L.) Czern.). [Russian.] *Doklady vsesojuz. Akad. sel'sk. Nauk*, 1951, 16: 1: 3-9, bibl. 3.

The use of granular superphosphate increased the yield and oil content of the seed of Chinese mustard. Intra- and inter-varietal pollination increases the vitality and yield of the plants, and can be carried out easily after preliminary removal of the stamens. Winter sowing increases the oil content of the seeds and induces winter resistance. Yellow-seeded plants produce seed with a higher oil content than dark blue-seeded plants.

2812. SLOOFF, W. C.

Het huidige standpunt inzake het openspringen van de onrijpe nootmuskaatvrucht. (The present position concerning the dehiscence of unripe nutmeg fruit.) *Landbouw*, 1950, 22: 411-15, bibl. 9.

It is a common occurrence for nutmeg fruits to open and fall before they are fully ripe, in some cases 60% of the crop being affected. Such nuts are either worthless for market or of very poor quality. The cause of this premature dehiscence is unknown but the following observations have been made by various workers. (1) Individual trees in an affected plantation may remain free from trouble, which suggests an inherent resistance. (2) The trouble increases with the age of the trees. (3) Many affected nuts have degenerate embryos, which suggests inadequate pollination. (4) The trouble is most severe when the trees are bearing a heavy crop. (5) Insufficient water supply or root competition (caused by close planting or interplanting with shade trees) increases the trouble. (6) Affected nuts are often attacked by the fungus *Coryneum myristicae*. It has been proved, however, that this is not the cause of premature dehiscence. All the available evidence suggests that the cause is a physiological one. Seed has been selected from productive trees that have shown resistance to the trouble, and an attempt is being made at the General Agricultural Research Station, Bogor, to develop a method for the vegetative propagation of desirable trees.

2813. DAVID, P. A.

Vanilla culture in the college of agriculture at Los Baños.

Philipp. Agric., 1950, 33: 239-49, illus.

Methods used in successful trial plantings of *Vanilla planifolia* are described. A light soil rich in organic matter and partially shaded by leguminous trees was used. The first step was to establish cuttings of *Gliricidia sepium* 3 × 3 m. to provide supports. Vanilla cuttings 1 m. or more in length were planted at the base of each support and tied to it. The cultivation and pollination methods used are described. The pods were harvested when fully mature, and were then cured by dipping in boiling water followed by sweating over a period of several weeks and finally by slow drying. The dried pods were sorted for quality and length and then bundled. Over two crops the 74 plants in the trial averaged 16 pods per plant per annum which was equivalent to a hectare yield of 35,552 pods with a total cured weight of 114.30 kg.

Hops.

(See also 3131.)

2814. MYŚLICKA, Z.

Badania nad jakością chmielu krajowego zbioru lat 1947 i 1948. (The quality of 1947 and 1948 Polish hops.) [Polish. English and Russian summaries 3 pp. each.] *Ann. Univ. Mariae Curie-Skłodowska, Sect. E*, 1950, 5: 277-347, bibl. 20, illus.

The material for this investigation was from experimental and commercial gardens in the Lublin district. Cones were variable in shape indicating a mixed origin.

A positive correlation was found between the weight of the cone and length of its strig [rachis]; negative correlations were established between the percentage of strig in total cone weight and both quality of cone and quantity of soft resins. Compactness of cone also proved to be negatively correlated to length of strig. The post-war deterioration in hop quality is ascribed to lower standards of cultivation, manuring and kilning.

2815. ONO, T.

Breeding of hops, with special reference to an induction of polyplods.

Seibutugaku Gyoseki, 1948, **11**: 1-10, from abstr. in *Heredity*, 1950, **4**: 397.

By the colchicine method the author has succeeded in producing polyplods in different strains of hop, including America, Early Zug, Shinsu-wase and Sapporo No. 6. Seedlings showing symptoms of polyplody were carefully selected and propagated vegetatively. The gigas plants, however, were not always pure tetraploids. Of 22 such gigas female plants, 12 produced in the progeny only triploids, 3 both diploids and triploids and the remaining 7 only normal diploids. Results indicate that in the last 2 cases all or part of the shoots might be diploid. The sex of tetraploids in hop is generally male or female and that of triploids, female or intersex. Sometimes male and female intersexes are found in polyplods. The triploid females are economically promising.

2816. PAINE, J.

The treatment of hop seed to improve germination.

A.R. E. Malling Res. Stat. for 1950, 1951, **A34**, pp. 139-40, bibl. 1, illus.

Tests carried out over the last 3 years indicate that the percentage germination of hop seed may be more than doubled by the removal of the operculum with a needle.

2817. BEARD, F. H.

Propagation trials with hops. VII. Number and size of sets produced from strap-cuts of certain varieties.*

A.R. E. Malling Res. Stat. for 1950, 1951, **A34**, pp. 190-2, bibl. 2.

Propagation trials of strap-cuts of 7 mosaic-tolerant and 7 mosaic-sensitive hops showed varietal differences in the number and size of good sets produced. In most cases differences in the number of sets produced could be associated with the incidence of downy mildew (*Pseudoperonospora humuli*) in the cuts. Differences in size were not always linked with the percentage rooting. It was not possible to correlate weather conditions with the seasons when large sets were produced. [Author's summary.]

2818. BEARD, F. H.

The classification of hop varieties according to their ease of picking.

A.R. E. Malling Res. Stat. for 1950, 1951, **A34**, pp. 187-9.

The ease of gathering hops is influenced by vigour and habit of growth, size of cone, and firmness of cone attachment, habit of growth being considered the most important factor. Information is given for Fuggle,

* Other papers in this series are abstracted in *H.A.*, **17**: 2342-4.

7 Goldings and 18 of the new varieties raised at Wye. A method of measuring the firmness of cone attachment is described, and brief observations are made on the special requirements when picking is done by machine.

Insecticidal plants.

(See also 2832k, l.)

2819. PLANK, H. K.

Insecticidal properties of some plants growing in Puerto Rico.

Bull. P.R. fed. Exp. Stat. Mayaguez, **49**, 1950, pp. 17, bibl. 22.

Results are given of laboratory "screening" tests of up to 9 different parts of 48 species of plants in 23 families. Six out of 11 species of Fabaceae, the largest family tested, and 1 out of 4 species of Clusiaceae, the next largest, were found to be toxic. The half-ripe fruits, mature seeds, and leaves of *Mammea americana* (mamey) and the seeds of some introductions of *Pachyrhizus erosus* (yam bean) showed definite insecticidal value.

2820. HAGEMAN, R. H., AND PAGAN, C.

The effect of season on the propagation of derris and lonchocarpus.

From abstr. in *Proc. Amer. Soc. hort. Sci.*, 1950, **56**: 234.

Twelve-inch woody stem cuttings of *Derris elliptica* and *Lonchocarpus* spp. were planted every 3 months over a 15-month period in Puerto Rico. The survival of cuttings of Changi III derris and of *Lonchocarpus* spp. was uniformly high throughout the year, although growth was better following propagation in May than in other seasons. With Sarawak Creeping derris May was also the best season, and propagation in August-September proved unsuccessful.

2821. HAGEMAN, R. G.

Flowering induced on *Derris elliptica*.

From abstr. in *Proc. Amer. Soc. hort. Sci.*, 1950, **56**: 235.

Flowering was induced in the derris varieties Sarawak Creeping and St. Croix in Puerto Rico by growing them over trellises in an open field exposed to full sunlight. Untrellised plants did not flower, whereas the variety Changi III has flowered annually in the field without trellising.

2822. VAN HOOF, H. A.

Cause and control of a leaf disease in *Derris elliptica* Benth. [Javanese summary 1½ pp.]

Contr. gen. agric. Res. Stat. Bogor, **115**, 1950, pp. 11, bibl. 9, illus.

The author describes a disease which attacks the young leaves and tendrils of *Derris elliptica* and identifies the causal fungus as *Colletotrichum derridis* n. sp. Of the clones grown by the General Agricultural Research Station, Bogor, those of the Ngawi group were the most susceptible. In the Kotari (Sarawak Creeping) and Pantu types, both leaves and tendrils were very resistant. The disease was more prevalent in the humid climate of West Java than in East Java, and attacks were more severe in nursery beds protected with an awning of dried palm leaves than in unprotected beds. Neither disinfection of the cuttings with mercuric chloride, an

organic mercury compound or a cuprous oxide preparation, nor disinfection of the soil with organic mercury compounds or a pentachloronitrobenzene preparation gave effective control. Dusting the plants with sulphur was also unsuccessful. Good control, however, was obtained by spraying the cuttings 3 times a week with 1% bordeaux mixture or 0.5% copper oxychloride. The importance of making the first application as soon as the cuttings have been planted is stressed. In order to prevent the spread of infection from older beds to younger ones, it is advisable to plant the beds in rapid succession.

Rubber plants.

2823. SUOMELA, H.
On the possibilities of growing *Taraxacum kok-saghyz* in Finland.
Valt. Maatalousk. Julk. 132, 1950, pp. 133, bibl. 162, illus.

Investigations carried out at the Agricultural Research Institute, Tikkurila, and other localities from 1943 to 1948 showed that kok-saghyz thrives in Finland on good, well-farmed loams up to latitude 66° N. Vegetative propagation was not successful, spring sowing (at 30-90 plants per row-metre) with vernalized seed being the most satisfactory method. Vernalization for 40-50 days gave the highest germination. Harvesting should take place 140 days or more after sowing, when the rosette-root weight ratio is below 1.5; 6-7 tons of roots with a rubber content of 1.8-1.9% of fresh weight can be obtained per ha. in the first year. The plants survived better in cold than in mild winters, particularly when the stands were dense. In the second year, stands in central and southern areas under favourable conditions yielded 6-7 tons of roots per ha. with a rubber content of 3.5-4.0% of fresh weight and the best yield of seed was produced by these second-year stands. The quality of rubber obtained compared favourably with that of hevea rubber, but the cost of production would prohibit commercial cultivation except when hevea rubber is difficult to procure.

Vegetable oils.

2824. KESTER, E. B.
Minor oil-producing crops of the United States.
J. Amer. Oil Chem. Soc., 1949, 26, p. 65,* reprinted with minor changes in *Econ. Bot.*, 1951, 5: 38-59.

The factors which determine whether it is profitable to extract oil from various agricultural wastes from canneries, wineries and drying yards are discussed in the introduction. It is never economic to extract oil unless there is residue saleable as feeding stuff or fertilizer. Apart from oil extracted from wastes, there are minor oils extracted from such crops as olives, avocado pears and safflower which are often grown for the sole purpose of oil production. Mention is made of the many oil-bearing wastes, such as watermelon and cantaloupe seeds, and the large number of wild seeds which are never likely to yield their oil economically. Evaluation of oil must take into account the price of similar bulk oils of commerce, the percentage of

* The original article has a bibliography of about 400 references.

unusual acids which may be in demand and the presence of such substances as vitamins, antioxidants, etc. In the main body of the article the crops are discussed individually under the headings nuts and pits, fruit pulps, fruit seeds, vegetable and domestic plant seeds, and wild plant seeds. Analyses of the oil-bearing portions of the crops are given. C.W.S.H.

2825. BENNETT, H., BROWN, E., AND ISLIP, H. T.
Licania mollis and *L. venosa* fruits from British Guiana.
Colon. Plant Anim. Prod., 1950, 1: 232-6.

These two species of *Licania* trees growing in rain forest produce fruit containing an oil similar to oiticica oil obtained from *L. rigida*. Examination of samples showed that the oil percentage was low by comparison with oiticica oil and that the shells of *L. mollis* were thick and hard. The oil of *L. mollis* was similar in many respects to oiticica oil, but that of *L. venosa* did not possess such good gelation and drying properties. It is considered that a price between that of linseed oil and oiticica oil might be obtained, but that owing to the low kernel and oil percentages collection might be comparatively unremunerative. C.W.S.H.

2826. CRUZ, A. O.
Composition of Philippine singkamas oil from the seeds of *Pachyrhizus erosus* (Linn.) Urb.
Philipp. J. Sci., 1949, 78: 145-7, bibl. 4.

The composition of the oil obtained from the seed of the yam bean was found to be similar to that of kapok, rice, cottonseed and peanut oils. Reference is made to the insecticidal properties of yam beans. [See also abstract 2819].

2827. CROSSLEY, A., AND HILDITCH, T. P.
The component acids of some authentic and commercial *stillingia* oils.
J. Sci. Food Agric., 1950, 1: 292-300, bibl. 8.

Stillingia oils from seeds of *Sapium sebiferum* and *S. discolor* have been examined at Liverpool University and the composition of their fatty acids determined.

2828. HEISER, C. B., Jr.
The sunflower among the North American Indians.
Abstr. in *Amer. J. Bot.*, 1950, 37: 662.

The wild sunflower (*Helianthus annuus*) was widely used by the Indians of the western United States. The achenes were used for food, the flowers were used ceremonially, and various parts of the plants were used in medicine. The cultivated sunflower (*H. annuus* var. *macrocarpus*) was grown in north-eastern America, the Great Plains, and the south-west extending into Mexico. The writer has grown a number of strains of Indian sunflowers and these differ in only minor respects from the modern white man's varieties. The sunflower is unique among cultivated plants in that it is one of the few crop plants to have been domesticated in temperate North America and one of the few cultivated plants whose wild progenitor still exists. The origin of the cultivated sunflower apparently took the following courses: (1) the use of the wild plant, (2) the rise of a weedy form, (3) actual cultivation of the weedy form with the subsequent development of a truly domesticated variety.—Indiana University, Bloomington.

Other crops.

Noted.

2829. DAVIDSON, F. F.

The effects of auxins on the growth of marine algae.

Amer. J. Bot., 1950, 37: 502-10, bibl. 10, illus.

Growth of vegetative thalli of *Fucus evanescens* and *Ascophyllum nodosum* in sea water was accelerated by IAA in concentrations ranging from 10^{-4} - 10^{-9} , inclusive. Corresponding concentrations of IBA inhibited growth in *Ascophyllum* and stimulated growth in *Fucus*. NAA induced maximum growth in concentrations of 10^{-7} and 10^{-8} in both plants. Hormone concentrations in lanolin (10^{-2} , 5×10^{-3} , 3×10^{-3} , and 10^{-3}) injected into the pneumatophores inhibited growth of the thalli of *Ascophyllum* and *Fucus*, and produced partial disintegration of the walls of the pneumatophores. *Fucus evanescens* oöspores failed to germinate in concentrations greater than 10^{-5} of IAA, IBA, NAA, and iodoacetic acid. Germination occurred freely in all lower concentrations and in sterile sea water. In general, *Fucus evanescens* sporelings cultured in sea water treated with a hormone or iodoacetic acid gradually increased in length of holdfasts and thalli and in the number of holdfasts as the hormone concentration decreased from 10^{-6} to 10^{-10} . In each series of concentrations, maximum growth was produced in a concentration which appeared to be specific for a particular hormone. These responses appear to be affected by light as well as the concentration of the hormone. No evidence was found to indicate that *Fucus* sporelings were capable of converting tryptophan into a growth substance. [From author's summary.]—Baylor Univ., Waco, Texas.

2830. TRIANA, J. V.

Algunos métodos de propagación y medidas de crecimiento en las especies *Guadua angustifolia* y *Bambusa vulgaris*. (Methods of propagation and growth measurements of *Guadua angustifolia* and *Bambusa vulgaris*.) *Bol. inf. Colombia*, 1950, No. 11, pp. 26-31.

In some parts of Colombia *Guadua angustifolia* flourishes in the wild state, and the possibility of growing it commercially is being investigated at the National Centre for Coffee Investigations. Preliminary results are reported of experiments on the propagation of this species and of *Bambusa vulgaris*. Growth studies are also being made to determine the effects of various environmental conditions on the development of the plants.

2831. MACHADO S., A.

Enraizamiento de la yuca. (Rooting of yuccas.)

Bol. téc. Colombia, 1949, 1: 23-40, from abstr. in *Bol. inf. Colombia*, 1950, No. 12, p. 16.

After indicating the importance of yuccas as a food or fodder crop and as a raw material for the manufacture of alcohol, starch, etc., the author reviews the literature on the cultivation of yuccas in the tropics and describes an experiment in which 2 different methods of planting are compared.

2832.

a BRYAN, C. E., BURNETT, N. C., AND WEARN, R. B.

Isolation of *d*-3-octanol from American oil of spermint.*J. Amer. chem. Soc.*, 1951, 73: 1848, bibl. 8.

b BUHRER, N.

Sobre a padronização de un método práctico para a dosagem da cafeína em erva-maté. (A practical method for the determination of caffeine in Yerba maté.) *Arq. Biol. Tec.*, 1946, 1: 177-80, from abstr. in *Bol. inf. Colombia*, 1950, No. 9, pp. 18-19.

c CARTER, C. L.

The constitution of karakin.

J. Sci. Food Agric., 1951, 2: 54-5, bibl. 5. From karaka nuts, *Corynocarpus laevigata*.

d CHAUDHRY, G. R., SHARMA, V. N., AND SIDDIQUI, S.

Chemical constituents of *Luffa amara* Roxb.: Part I.—Isolation of a crystalline bitter from the seeds.*J. sci. industr. Res. India*, 1951, 10, Sect. B, p. 26, bibl. 1.

e CHEVALIER, A.

Le kudzu (*Pueraria hirsuta*) et quelques autres légumineuses anti-érosives à cultiver dans les pays tropicaux. (Kudzu and other anti-erosion leguminous plants for growing in tropical countries.)

Rev. int. Bot. appl., 1951, 31: 159-72, bibl. 74, illus.

f GUENTHER, E., AND LANGENAU, E. E.

Essential oils and related products.

Analyt. Chem., 1951, 23: 217-20, bibl. 71. A review of analytical procedure. For previous paper, see *H.A.*, 20: 2121h.

g GUNTHER, F. A., AND BLINN, R. C.

Test for microdetection of parathion in orange and lemon oils.

Analyt. Chem., 1950, 22: 1450, bibl. 3.

h HILDITCH, T. P., MEARA, M. L., AND PATEL, C. B.

The component acids and glycerides of *Pentaclethra* (Leguminosae) and *Lophira* (Ochnaceae) seed fats.

J. Sci. Food Agric., 1951, 2: 142-8, bibl. 13.

i HILTY, W. W., AND MARSH, M. M.

Pharmaceuticals and natural drugs.

Analyt. Chem., 1951, 23: 237-43, bibl. 174. A review of analytical procedures.

j HOLGATE, K. C.

Changes in the composition of maple sap during the tapping season.

Bull. N.Y. St. agric. Exp. Stat. 742, 1950, pp. 14, bibl. 16, illus.

k J., R. M.

Ryania as an insecticide.

Colon. Plant Anim. Prod., 1950, 1: 242-3.

- l JACOBSON, M.
Constituents of *Heliopsis* species. I. Scabrin, an insecticidal amide from the roots of *H. scabra* Dunal.
J. Amer. chem. Soc., 1951, 73: 100-3, bibl. 8.
- m PERCIVAL, E. G. V., AND ROSS, A. G.
The constitution of laminarin. Part II. The soluble laminarin of *Laminaria digitata*.
J. chem. Soc. Lond., 1951, No. 3, pp. 720-6, bibl. in text.
- n RETI, L., AND CASTRILLÓN, J. A.
Cactus alkaloids. I. *Trichocereus terscheckii* (Parmentier) Britton and Rose.
J. Amer. chem. Soc., 1951, 73: 1767-9, bibl. 6.
- o STEPHEN, A. M.
Acacia mollissima Willd. Part I. The component sugars and aldobiuronic acid of black wattle gum.
J. chem. Soc. Lond., 1951, No. 3, pp. 646-9, bibl. in text.
- p U.S. DEPARTMENT OF AGRICULTURE AND UNIVERSITY OF FLORIDA.
Ramie production in Florida. A progress report.
[Publ.] U.S. Dep. Comm., Off. tech. Serv., industr. Res. Div., 1948, pp. 184, bibl. 43, illus. [received 1951].
A summary of this very detailed report was abstracted in *H.A.*, 19: 3437.

FLORICULTURE.

General.

(See also 2421, 3098, 3099, 3116, 3135.)

2833. DERMEN, H.
Pattern reversal in variegated plants; an explanation of reversal in coloration in the histogenic type of variegation.
J. Hered., 1950, 41: 325-8, bibl. 4, illus.
Certain types of variegation and changes of pattern in leaves of poinsettia (*Euphorbia pulcherrima*) and privet (*Ligustrum vulgare*) were investigated by the Bureau of Plant Industry, Beltsville, Md. They are considered to be of histogenetic origin, to arise somatically during the growth of the plant, and to be caused by mutations occurring in the apical meristem of the growing point, affecting only one of the meristematic layers.
2834. COOLEY, J. S.
Control of white root rot with chloropicrin in a border of ornamental plants.
Phytopathology, 1951, 41: 379-8, bibl. 1.
A border of ornamental shrubs and herbaceous perennials severely infested with *Corticium galactinum* was cleared of plants (in 1941) in the affected zone, the soil of which was then injected with chloropicrin at staggered 1-ft. intervals (2 ml. per injection). The plot was replanted the following year and a second planting made in 1947. Up to 1949 there was no evidence of re-infestation.

Annuals and herbaceous plants.

(See also 2245, 2267, 2576, 2887a, p, s, 3092, 3095, 3115.)

2835. EMSWELLER, S. L.
Growing annual flowering plants.
Fmrs' Bull. U.S. Dep. Agric. 1171, revised 1950, pp. 26, illus.
First issued in 1921 and now brought up to date, this bulletin gives a short general account of raising plants and other cultural practices, followed by brief descriptions of 42 annuals. In the section on starting the plants the use of vermiculite as a germinating medium is described.
2836. OLIVER, R. W.
Annual flowers for Canadian gardens.
Publ. Canada Dep. Agric. 796, revised 1950, pp. 31, illus.

The greater part of this publication is devoted to a descriptive list of annuals and to lists of annuals best suited to various sections of Canada, of types for outdoor sowing and of types grown for special purposes. Notes are supplied on the arrangement of annual flower beds, seeds and sowing, soils, and the control of insect pests.

2837. OLIVER, R. W.
Herbaceous perennials for Canadian gardens.
Publ. Canada Dep. Agric. 784, revised 1950, pp. 88, illus.
This comprehensive publication contains information on the arrangement and cultivation of perennial borders, the propagation of plants and the control of pests and diseases, but is mainly devoted to notes on species and varieties (58 pp.). These descriptions are followed by lists of bulbous plants, plants for sunless positions, plants for particularly dry situations, and perennials recommended for 23 different sections of Canada, and by a list of common and Latin names.
2838. SAITO, K.
Studies on inducing polyploid flower plants and their utilization. II. On several polyploid plants of cynoglossum, coreopsis, dianthus and others. [Japanese. English summary ½ p.]
J. hort. Ass. Japan, 1950, 19: 107-12, bibl. 4.
In 1948 several new polyploid ornamental plants were induced by colchicine treatment. The mutants in 7 herbaceous species are tabulated with their chromosome numbers, and with brief descriptions of the flowers.
2839. SEIKEL, M. K., AND GEISSMAN, T. A.
Anthochlor pigments. VII. The pigments of yellow *Antirrhinum majus*.
J. Amer. chem. Soc., 1950, 72: 5725-30, bibl. 25.
1. The pigment mainly responsible for the yellow colors in *Antirrhinum majus* is not luteolin as previously reported but is a glucoside of 3',4',4,6-tetrahydroxy-benzalcoumaranone. 2. The identification of this pigment, aureusin, represents the second anthochlor pigment found to have a benzalcoumaranone structure. 3. A flavanone pigment was also isolated from yellow *Antirrhinum majus* and shown to be a glycoside of

naringenin. 4. The absorption spectra of two series of benzalcoumaranone pigments (leptosin and aureusin) and their derivatives have been determined and compared. [Authors' summary.]

2840. DIMOCK, A. W.

The dispersal of viable spores of phytopathogenic fungi by fungicidal sprays.

Phytopathology, 1951, **41**: 157-63.

Experiments indicate that copper-8-quinolinolate sprays may not only fail to control snapdragon rust but actually intensify it by carrying viable spores in the spray stream from sporulating uredia to clean plants.—Cornell Univ.

2841. MARAMOROSCH, K.

Serial passage of aster-yellows virus through the aster leafhopper.

From abstr. in *Phytopathology*, 1951, **41**: 25.

Studies are described which provide further evidence that the aster-yellows virus can multiply in its leafhopper vector, *Macrostelus divisis* Uhler.

2842. NOORDAM, D., THUNG, T. H., AND VAN DER WANT, J. P. H.

Onderzoekingen over anjer-mozaiek, I. (Investigations on carnation mosaic, I.) [English summary 2½ pp.] *Tijdschr. PLZiekt.*, 1951, **57**: 1-15, bibl. 15, illus.

A virus disease of carnations in the Netherlands is characterized by yellowish to grey-brown spots on the leaves; often the spots coalesce to form larger spots or lines. The disease is transmissible by grafting. The physical properties of the virus *in vitro* were determined. An antiserum against the virus was prepared by injecting rabbits with partly purified virus.

2843. VAN DER WANT, J. P. H.

Onderzoekingen over anjer-mozaiek, II. (Investigations on carnation mosaic, II.) [English summary ¾ p.] *Tijdschr. PLZiekt.*, 1951, **57**: 72-4, bibl. 3.

The sap of healthy carnation plants carries a factor which inhibited transmission of some viruses to the test plants used, i.e. tobacco necrosis virus from tulip to tobacco and the tobacco mosaic and rattle viruses from tobacco to tobacco. This virus-inhibiting effect may be the cause of the difficulty in transmitting the carnation mosaic virus from carnation to aster, tobacco, and French bean.

2844. RUMLEY, G. E., AND THOMAS, W. D., Jr.

The inactivation of the carnation-mosaic virus.

Phytopathology, 1951, **41**: 301-3, bibl. 6, being *Sci. J. Ser. Art. Colo. agric. Exp. Stat.* 332.

Experiments have indicated that the carnation-mosaic virus may be inactivated chemically *in vivo*, but the phytotoxic effect of the chemicals makes treatment of unrooted cuttings impracticable.

2845. NOORDAM, D.

Enkele ziekten in Amerikaanse anjers. (Some diseases of carnations.) [English summary 1 p.] *Meded. Dir. Tuinb.*, 1950, **13**: 702-16, bibl. 10, illus.

The three chief diseases of carnations grown under glass in the Netherlands are (1) a vascular disease caused by *Phialophora cinerescens* (= *Verticillium cinerescens*), (2) a wilt caused by *Fusarium oxysporum*, (3) rust, *Uromyces caryophyllinus*. These diseases are described and control measures mentioned.

2846. STODDARD, E. M., AND DIMOND, A. E.

The chemotherapeutic control of fusarium wilt of carnations.

Phytopathology, 1951, **41**: 337-40, bibl. 4.

Effective control of fusarium wilt of carnations was obtained with 2-norcamphane methanol 1:16,000, 4-chloro-3,5-dimethyl phenoxy ethanol 1:64,000, and copper-8-quinolinolate 1:4,000, applied at weekly intervals for about 4 months to rooted cuttings in flats, at the rate of approximately 12½ gal. per 100 sq. ft. of bench surface.—Connecticut agric. Exp. Stat.

2847. SPENCER, J. L., AND WHITE, H. E.

Anther smut of carnation.

Phytopathology, 1951, **41**: 291-9, bibl. 21, being *Contr. Mass. agric. Exp. Stat.* 751.

Carnation plants infected with smut (*Ustilago violaceae*) bear flowers containing no carpels but an abnormal quantity of anthers in which pollen has been replaced by chlamydospores. Except on the flowers, infection cannot be induced through unbroken surfaces. Flowers, buds, and ends of excised stems, in that order, are the most susceptible areas. Young growth is much more liable to infection than is old growth. Infested sand and soil may be a source of inoculum. Diseased plants should be removed at once and burned; soil treatment for smut should be necessary only in cases of severe infestation.

2848. BRIERLEY, P., AND SMITH, F. F.

Hardy varieties main target of mum stunt as five-year war eases greenhouse threat. (Chrysanthemum stunt after five years.) *Flor. Exch.*, 1951, **116**: 13: 11, 14, 30-1, 33, bibl. 13.

Chrysanthemum stunt, a virus disease known for about five years, is now declining in importance in florists' mums, but increasing in hardy varieties. Symptoms vary greatly in different varieties. The virus persists in cuttings and to some extent in crop residues. Transmission occurs chiefly during commercial handling practices. Crinkle and measles are varietal expressions of stunt. A mosaic virus accompanies stunt in crinkled Blanche and Yellow Garza. As expression of symptoms is slow, contaminated plants can serve as virus sources long before they express stunt. Grafting brings faster expression, and certain varieties that respond quickly are useful for graft indexing. Re-selection of healthy stock has been successful in florists' varieties. A programme of graft-indexing is suggested to speed re-selection in hardy chrysanthemums. [Authors' summary.]—U.S. Dep. Agric., Beltsville, Md.

2849. DIMOCK, A. W.

The dispersal of viable fungus spores by insecticides.

Phytopathology, 1951, **41**: 152-6.

Chrysanthemum foliage was successfully inoculated with *Septoria obesa* and snapdragon foliage with

Puccinia antirrhini by spraying the plants with suspensions of spores of the respective fungi in normal preparations of a number of insecticides. Many of the insecticidal formulations had no significant fungicidal value; others were moderately to highly fungicidal.—Cornell Univ.

2850. SEIKEL, M. K., AND GEISSMAN, T. A.
Anthochlor pigments. VI. The pigments of *Coreopsis stillmanii*.
J. Amer. chem. Soc., 1950, **72**: 5720-4, bibl. 25.

The anthochlor pigment of *Coreopsis stillmanii* has been identified as a chalcone derivative. The pigment, stillopsin, is a hexoside of the hitherto unreported 3,4,2',4',5'-pentahydroxychalcone. [From authors' summary.]

2851. VON ARX, J. A., AND NOORDAM, D.
 Valse meeldauw (*Peronospora pulveracea* Fuckel) op *Helleborus niger*. (The downy mildew of black hellebore.) [German summary ½ p.]
Tijdschr. PlZiekt., 1951, **57**: 32-4, bibl. 3, illus.

Downy mildew infects greenhouse-forced, black hellebore plants, causing the perianth leaves to remain small and to be discoloured. Diseased plants failed to recover when sprayed with bordeaux mixture. Affected plants should be eliminated.

2852. SUBRAMANYAM, K.
Origin and nature of haustoria in *Lobelia cardinalis*.
Bot. Gaz., 1951, **112**: 319-22, bibl. 15, illus.

In *Lobelia cardinalis* the pollen tube destroys one of the synergids, and the other degenerates after fertilization. The antipodals persist during the early stages of endosperm development. At the 8-cell stage of the endosperm the two terminal cells at each end develop into the micropylar and chalazal haustoria respectively.—Central College, Bangalore.

2853. KNJAZEV, A. A.
New information about sexual hybridization in paeonies. [Russian.]
Priroda, 1950, **39**: 12: 55-6, illus.

Brief notes are given on *Paeonia chinensis hybrida*, *P. tenuifolia* (fine-leaved paeony) and *P. moutan* (tree paeony) with an account of hybridizing them. Hybridization between the tree paeony and the herbaceous forms was possible, and it induced early ripening of the seeds both in *P. moutan* and the garden hybrid.

2854. THEIS, T. N., RIKER, A. J., AND ALLEN, O. N.
The destruction of crown-gall bacteria in periwinkle by high temperature with high humidity.
Amer. J. Bot., 1950, **37**: 792-801, bibl. 28, illus.

Some critical factors influencing the killing of *Agrobacterium tumefaciens* in periwinkle by heat treatment were studied. *In vitro* the bacteria did not survive exposure to 46.5° C. for more than 24 hours. *In vivo* viable bacteria were recovered after 5 days at 48.5° C. with a relative humidity of 40-50%. Both bacteria and plants withstood high temperatures best with low humidity. Complete elimination of the bacteria was

obtained with an R.H. above 65% during heat treatment. Under these conditions, however, the galls became heavily contaminated with fungi, chiefly *Penicillium* sp., which inhibited development of crown-gall bacteria. When stems were enclosed in glass cylinders, surface sterilized, inoculated and heat-treated at 46.5° C. for 3 days at 85% R.H., large fungus-free and bacteria-free galls developed.—Univ. Wisconsin, Madison.

2855. ZIMMERMAN, P. W., AND KJENNERUD, J.
Flowering and other responses induced in *Piqueria trinervia* with photoperiodic treatment.
Contr. Boyce Thompson Inst., 1950, **16**: 177-89, bibl. 6, illus.

The common stevia (*Piqueria trinervia*) showed marked responses to photoperiodic treatments. Two or more 16-hr. dark treatments with 8-hr. light periods induced flower development which persisted after the treatments were stopped. Inflorescence number increased with the number of long dark periods. Only treated branches produced flowers, showing that the effect was local. Flower induction was affected by temperature, no flowers being formed with a temperature as low as 35° F. Branching of the terminal region occurred with flowering. C.W.S.H.

2856. ANON.
Diseases of poppies.
Agric. Gaz. N.S.W., 1950, **61**: 465-6, illus.

Notes on the cause and control of spotted wilt (virus), downy mildew (*Peronospora arborescens*) and crown rot (*Phytophthora cryptogea*).

2857. REED, C. F.
Distribution of the genus *Trillium* in Kentucky.
 From abstr. in *Amer. J. Bot.*, 1950, **37**: 666.

The genus *Trillium* is represented by 10 species and about 5 varieties and forms in Kentucky. Each of the species seems to prefer a definite soil type. Their distribution is indicated.

2858. HASKELL, D.
Plant chromosome-races and their ecology in Great Britain.
Nature, 1951, **167**: 628-9, bibl. 19.

Tetraploid and octoploid valerian and tetraploid *Nasturtium microphyllum*, the perennial winter water-cress, are among the polyploid forms discussed.

Bulbs, tubers, etc.

(See also 2563, 2887c, e, h, i, o, t.)

2859. MEZZETTI, A.
 Il marciume del pedale della calla prodotto dal *Bacterium aroideae* (Town.) Stapp in Italia. (Basal rot of the calla lily produced by *Bacterium aroideae* in Italy.) [English summary 7 lines.]
Ann. Sper. agrar., 1951, **5**: 207-20, bibl. 10, illus.

The occurrence of a bacterial basal rot of calla lily, *Zantedeschia aethiopica*, is recorded for Italy. Disinfection of the seed and of the earth with formalin has given promising results.

2860. WELLENSIEK, S. J., DOORENBOS, J., AND DE HAAN, I.
Systematiek, cytologie en genetica van cyclamen. (Taxonomy, cytology and genetics of cyclamen.) [English summary $\frac{1}{2}$ p.]
Meded. Dir. Tuinb., 1950, 13: 608-19, bibl. 10, illus.

Cultivated varieties of *Cyclamen persicum grandiflorum* and of other cultivated and wild species were collected, and pedigree plants selected for selfing and crossing. A survey is given of the genus *Cyclamen*, the variability of *C. persicum* is described, and the history of this species in cultivation is outlined.

2861. LOOSJES, F. E.
Enige proeven met bestrijdingsmiddelen tegen de larve van de lapsnuittor (=taxus-kever), schadelijk aan cyclamenplanten. (Control experiments against *Otiorrhynchus sulcatus* L. infesting cyclamens.)
Tijdschr. PlZiekt., 1951, 57: 38-42.

A 2-hours' immersion of the pots in a DDT-emulsion, containing 0.2% technical DDT, had some effect against the grubs and the plants were not injured by the treatment.

2862. CALVINO, E. M.
L'aborto della spiga nel gladiolo. (The abortion of gladiolus spikes.)
Riv. Ortoflorofruttic. ital., 1950, 34: 130-3.

A disorder of gladiolus plants, the spikes failing to develop or remaining weak with few flowers, is attributed to excess of one or more of the factors: nitrogen fertilizers, irrigation, or temperature.

2863. BRIDGMON, G. H.
Gladiolus as a virus reservoir.
From abstr. in *Phytopathology*, 1951, 41: 5.

In a study on the prevalence of bean virus 2 in gladiolus plantings in the vicinity of Madison, Wisconsin, the typical and pod-distorting strains were found commonly in plants showing leaf mottle and flower break. Two other viruses recovered repeatedly from the same source were a strain of the tobacco ring-spot virus and a strain of cucumber virus 1. Gladiolus is a newly recorded host for these two viruses. A causal relationship between any of the viruses and flower break in gladiolus was not established.

2864. GOODEY, J. B.
The potato tuber nematode, *Ditylenchus destructor* Thorne, 1945; the cause of eelworm disease in bulbous iris.
Ann. appl. Biol., 1951, 38: 79-90, bibl. 25, illus.

Examination of nematodes from diseased iris bulbs showed them to have the characters of *Ditylenchus destructor*, the potato eelworm, and not those of *D. dipsaci*, previously considered to be the iris bulb eelworm.—Rothamsted exp. Stat.

2865. COURTNEY, W. D., AND GOULD, C. J.
Tolerance of Wedgewood iris bulbs to a hot-water formalin treatment.
Phytopathology, 1951, 41: 40-5, bibl. 6, being *Sci. Pap. Wash. St. agric. Exp. Stat.* 889.

Trials showed that iris bulbs can be safely treated for

3 or 4 hours in hot-water-formalin for nematode control. The treatment consisted of immersion in water at 110° F. with 1 pt. commercial formaldehyde solution added to each 25 gal. water.

2866. MCWHORTER, F. P., AND BRIERLEY, P.
Anatomical symptoms useful in diagnosis of lily rosette.
Phytopathology, 1951, 41: 66-71, bibl. 9, illus., being *Tech. Pap. Ore. agric. Exp. Stat.* 614.

Necrosis of the vascular tissues, usually in the phloem elements and sheath cells, occurs regularly in leaves of *Lilium longiflorum* infected with rosette virus. These are easily demonstrated in free-hand sections of living leaves mounted in 0.05% trypan blue.

2867. ANDISON, H.
The narcissus bulb fly and its control in British Columbia.
Processed Publ. Canada Dep. Agric. Div. Ent. 117, 1951, pp. 7, illus.

The distribution, host plants and habits of the narcissus bulb fly, *Lampetia equestris*, are outlined. Measures for field control (applications of summer oil emulsion being most satisfactory) and after-harvest bulb treatment, with hot water or fumigation with methyl bromide, are described.

Orchids.

(See also 3110.)

2868. ROTOR, G., JR., AND MACDANIELS, L. H.
Flower bud differentiation and development in *Cattleya labiata* Lindl.
Amer. J. Bot., 1951, 38: 147-52, bibl. 9, illus.

Flower bud initiation in *Cattleya labiata*, Lindl. occurred in the last week of June in 1949 at Ithaca, N.Y., under usual greenhouse conditions. The inflorescence was found to be indeterminate and the flowers formed in two ranks in the axils of bracts. The ventral sepals developed most rapidly followed by the labellum, the two lateral petals, the dorsal sepal and, lastly, the column. The two lateral petals and the two stigmas are all derived from the upper lobe of the invaginated primordium while the lower lobe gives rise to the dorsal sepal, the column and all the structures present on the column. The invagination of the floral primordium later develops into the cavity of the ovary. At the time when the whole inflorescence inside the flower sheath becomes vaguely discernible as a short conical structure by holding the sheath to the light, the buds are already well developed with all the parts differentiated. At this stage the inflorescence is about 3 mm. long. The buds of *Cattleya labiata* Lindl. exhibit the phenomenon of inversion during an interval of 3 days between complete emergence from the sheath and opening. The period when environmental factors have the most critical effect on flower production starts at the time the flower buds are initiated and extends to the stage when they are fully differentiated. No relationship was established between the length of the pseudo-bulb or the stage of leaf development and flower bud initiation. Observations made indicate a relationship between flower bud initiation and day-length.—Cornell Univ., Ithaca, N.Y.

Roses.

(See also 2593, 2801, 2887f, g, 2942, 3115.)

2869. ANDERSEN, O.

Cultura da roseira. (Rose-growing.)

Rev. Ceres, 1950, 8: 258-77, bibl. 6.

This article consists of a list of roses recommended for growing in Brazil arranged in categories according to colour, together with advice on propagation, the formation of a rose garden, cultivation, control of pests and diseases, pruning and manuring.

2870. ASEN, S., AND LARSON, R. E.

Artificial culturing of rose embryos.

Prog. Rep. Pa agric. Exp. Stat. 40, 1951,

pp. 4, bibl. 22, illus.

A method of culturing rose embryos artificially is described which involves the use of a cellulose dissolving solvent for removing the outer seed coat. The method is stated to be practical and can be used advantageously by rose breeders. It makes possible the raising of two generations per year, instead of the one generation every 12 or 18 months obtained by ordinary breeding and cultural procedures.

2871. ROSEN, H. R.

Miriam's Climber. A new pink climbing rose for Arkansas.

Rep. Ser. Ark. agric. Exp. Stat. 20, 1950,

pp. 6, illus.

The origin of this outstandingly vigorous rose, which should be distinguished from the English tea rose, Miriam, is described. It has proved very frost resistant and comparatively resistant to powdery mildew, black spot and anthracnose.

2872. McDONOUGH, E. S., AND FOLL, S. C.

Excess callusing in roses as related to flower production and vegetative growth.

Phytopathology, 1951, 41: 196-7, illus.

In comparing the productivity of roses having callus knots at the graft union with those having no excess callus, there was no difference in vegetative growth or flower production. Roses with callus overgrowths are therefore as suitable as roses with normal grafts for cultivation under glass.—Marquette Univ., Wisconsin.

2873. OKNINA, E. Z., AND MARKOVIČ, A. A.

Ways of increasing frost-resistant roses (*Rosa gallica*). [Russian.]

Izv. Akad. Nauk S.S.S.R. Ser. biol., 1951,

No. 1, pp. 107-14, bibl. 8, illus.

Rosa gallica is subject to winter injury and is therefore unsuitable for cultivation in the northern parts of Russia. Applications of synthetic growth substances with the object of inducing winter resistance were unsuccessful, for weak solutions encouraged growth and delayed the incidence of the rest period, while the higher concentrations caused damage to the buds and so lowered production. *R. rugosa* appears to be very frost-resistant and so should prove to be a suitable species for hybridization with *R. gallica* to obtain new varieties suitable for cultivations in the north.

2874. KIRSANOVA, V. A.

Vitamin C content in different varieties of rose-hips of the Tashkent district. [Russian, English summary 9 lines.]

Biohimija, 1944, 9: 64-71, bibl. 6 [received 1951].

The hips of Uzbek species of rose show a wide variation of vitamin C content in the dry pulp, from 0.5-2% in some to 10-15% or even up to 17% in others, the species growing at high altitudes being particularly rich. The vitamin content in 29 species is tabulated.

Shrubs and trees.

(See also 2322, 2887 l, m, u, 3097, 3110, 3131.)

2875. JOHNSON, E. W.

Ornamental shrubs for the southern Great Plains.

Fmrs' Bull. U.S. Dep. Agric. 2025, 1951,

pp. 62, illus.

This bulletin discusses the influence of such factors as climate, topography and soil on shrubs, and gives the size, form, use, methods of propagation, and behaviour of 182 shrubs tested in various parts of the southern Great Plains, which are characterized by low rainfall, early autumn and late spring frosts and almost constant wind.

2876. JOHNSON, E. W.

Ornamental woody vines for the southern Great Plains.

Fmrs' Bull. U.S. Dep. Agric. 2015, 1950,

pp. 22, illus.

The southern Great Plains are characterized by low rainfall, a wide range and quick changes of temperature and a tendency for soils to be alkaline. This bulletin discusses the selection, planting, and care of woody vines, and describes 25 plants that have been tested and found suitable for the region.

2877. SMITH, B. C.

Seed cleaning studies at Ohio.

Amer. Nurseryman, 1951, 93: 9: 9, illus.

Methods developed at the Ohio State University for removing pulp, seed coats, etc., from ornamental shrub seeds are described. In the case of *Viburnum lantana*, 39% germination was obtained following removal of the seed coat compared with nil for untreated seed.

2878. FILLMORE, R. H.

Semiautomatic watering devices for propagating benches.

Amer. Nurseryman, 1951, 93: 6: 7-8, 41-3,

bibl. 7, illus.

Constant watering of glasshouse benches at the Arnold Arboretum was found beneficial in propagating ornamental shrubs and trees both from seed and by cuttings. The conversion of existing benches by the use of a poultry fountain to either a constant water level or drip method is described.

2879. WELLS, J. S.

Pointers on propagation.

Amer. Nurseryman, 1950, 92: 6: 16-18, and 1951, 93: 8: 11, 73-4, illus.

Good rooting was obtained with rhododendrons in a propagating house in which a constant relative humidity of 92% was maintained. Monarch H261 nozzles, producing a thick fog of fine water vapour, were attached at 4-ft. intervals along a copper tubing and fed from the normal water supply at 60-70 lb. per sq. in. pressure. Cuttings of other plants are being tried in this humid atmosphere, and so far forsythias and softwood, but not older, cuttings of magnolias

have rooted well. *Ilex* spp., juniper, chamaecyparis, thuja, and *Prunus* have shown a very high percentage of rooting.

2880. MARINARI, A.

Le azalee in Belgio e in Italia. (The azalea in Belgium and Italy.)

Riv. Ortoflorofruttic. ital., 1951, 35: 82-7, illus.

An account is given of the nomenclature and origin of azaleas, with observations on azalea culture in Belgium and Italy.

2881. PLAKIDAS, A. G.

Camellia flower blight.

Ext. Publ. La Div. agric. Ext. 1071, 1950, pp. 4, illus.

Flower blight, the most serious disease of camellias, is caused by *Sclerotinia camelliae*, the life cycle of which is outlined. Spraying the ground under the plant for the purpose of preventing the development of apothecia has been tried with promising results. The use of asphalt paper as a ground cover between late December and the end of blossoming is also suggested.

2882. JAMES, M. O., AND PLAKIDAS, A. G.

Foot rot of Chinese hibiscus.

From abstr. in *Phytopathology*, 1951, 41: 19.

A fatal disease of the Chinese hibiscus, *Hibiscus rosa-sinensis*, has appeared in various parts of Louisiana. The causal organism has been tentatively identified as *Phytophthora cactorum* var. *applanata* Chester. Symptoms of the disease are described, and varieties found to be susceptible are indicated.

2883. JOHNSON, M. A.

Relationship in the Magnoliaceae as indicated by some biochemical properties of seed proteins.

From abstr. in *Amer. J. Bot.*, 1950, 37: 663.

Preliminary tests indicate that serologically there is great similarity in the seed proteins of the representatives of both the Asiatic and American species of *Magnolia* studied to date. It has been possible, however, by the use of three antisera to separate *M. kobus* and *M. obovata* from the American *M. glauca* and *M. tripetala*. *Michelia champaca* is readily separable from *Magnolia kobus*.—Rutgers Univ., N.J.

2884. PUCCINI, G.

"*L'Oreopanax*" *capitatus*: pianta ornamentale da appartamento e da piena terra. (*Oreopanax capitatus*: an ornamental plant for growing under glass or in the open.)

Riv. Ortoflorofruttic. ital., 1950, 34: 209-17, bibl. 15, illus.

An account is given of *Oreopanax capitatus* grown as an ornamental bush. Its nomenclature, botanical morphology, cultivation and propagation by layering and cuttings are described.

Lawns.

(See also 2542.)

2885. VAUGHN, J. R.

Cycloheximide, an antibiotic effective against turf diseases.

Abstr. in *Phytopathology*, 1951, 41: 36.

Cycloheximide, at 200 p.p.m., was sprayed at 2-week intervals throughout the season on golf-green plots at

six locations in Michigan, in comparison with two standard turf fungicides. Counts of dollar spot (*Sclerotinia homeocarpa*), which was prevalent at five locations in both spring and fall, were consistently lower in cycloheximide-treated plots than in those treated with other materials. Melting out (*Helminthosporium* sp.), which was severe at one location, was completely checked by cycloheximide but not by the other fungicides. In cycloheximide-treated plots no phytotoxicity was observed on any of the several strains of bent grass.

2886. FLEMING, W. E.

Protection of turf from damage by Japanese beetle grubs.

Leaf. U.S. Dep. Agric. 290, 1950, pp. 8, illus.

The life-history of Japanese beetle, *Popillia japonica*, is illustrated by a drawing showing the stages of development throughout the year, and the injury to grass caused by the grubs is described. Control can be effected by applying lead arsenate, DDT or chlordane; methods of application are described and illustrated.

Noted.

2887.

a AMES, R. W., AND OTHERS.

Partial purification of carnation-mosaic virus.

From abstr. in *Phytopathology*, 1951, 41: 1.

b BALDWIN, J. T., JR., AND SPEESE, B. M.

Cytogeography of *Chlorophytum* in Liberia.

Amer. J. Bot., 1951, 38: 153-6, bibl. 6, illus.

c BERKELEY, G. H.

Gladiolus viruses.

From abstr. in *Phytopathology*, 1951, 41: 3-4.

d BOKE, N. H.

Histogenesis of the vegetative shoot in *Echinocereus*.

Amer. J. Bot., 1951, 38: 23-38, bibl. 25, illus.

e BRIERLEY, P., AND SMITH, F. F.

Some vectors, hosts, and properties of dahlia mosaic virus.

Plant Dis. Repr., 1950, 34: 363-70, bibl. 3, illus.

f BUTTERFIELD, H. M.

Rose culture in California.

Circ. Calif. agric. Exp. Stat. 148, revised 1950, pp. 44, bibl. 10, illus.

g CHADWICK, L. C.

Ground corncobs as a mulch for roses.

Brooklyn bot. Gdn Rec., 1950, 6: 206.

h CHEVALIER, A.

Sur quelques crinum's de l'Afrique tropicale. (Some crinums of tropical Africa.)

Rev. int. Bot. appl., 1950, 30: 610-25, illus.

i CHEVALIER, A.

Trois amaryllidées cultivées en Afrique tropicale par les noirs. (Three amaryllidaceous plants cultivated by the negroes in tropical Africa.)

Rev. int. Bot. appl., 1950, 30: 625-9, illus.

j HALL, B. A.

The nature of the floral disk in the Aceraceae and some related families.

From abstr. in *Amer. J. Bot.*, 1950, 37: 662.

- k HEINIG, K. H.
Studies in the floral morphology of the Thymelaeaceae.
Amer. J. Bot., 1951, **38**: 113-32, bibl. 48, illus.
- l JENKINS, A. E., and JEHL, R. A.
Sphaceloma viburni destructive to snowball in Maryland.
Plant Dis. Repr., 1950, **34**: 350-1.
Snowball is *Viburnum opulus* var. *roseum* L.
- m JOHNSON, A. T.
Rhododendrons in woodland.
J. roy. hort. Soc., 1951, **76**: 128-34.
Suitable species and hybrids are suggested.
- n MASON, C. T., Jr.
Development of the embryo-sac in the genus *Limnanthes*.
Amer. J. Bot., 1951, **38**: 17-22, bibl. 6, illus.
- o PLAKIDAS, A. G.
Comparative pathogenicity of two colletotrichums on Easter-lily bulbs.
From abstr. in *Phytopathology*, 1951, **41**: 29-30.
- p POHL, R.
Die Wirkung von Wuchsstoff und Hemmstoff auf das Wachstum der Pollenschläuche von *Petunia*. (The action of a growth promoting substance and of a growth inhibitor on the growth of pollen tubes of *petunia*.)
Biol. Zbl., 1951, **70**: 119-28, bibl. 10.
- q PRINCIPI, G.
Il calicanto. (*Calycanthus*).
Riv. Ortoflorofruttic. ital., 1951, **35**: 39-41, illus.
Species of *Calycanthus* and *Chimonanthus* are briefly described.
- r VAN RAALTE, D.
De teelt van bloemisterijgewassen in zuid-Frankrijk (Côte d'Azur). (Floriculture in the South of France.) [English summary $\frac{1}{2}$ p.]
Meded. Dir. Tuinb., 1950, **13**: 837-59, bibl. 4, illus.
- s SCHULTZ, H.
Untersuchungen über die Rolle von *Pythium*-Arten als Erreger der Fusskrankheit der Lupine. II. Ergebnisse von Infektionsversuchen. (Investigations on the rôle of *Pythium* spp. as the cause of foot rot of lupins. II. The results of infection tests.)
Phytopath. Z., 1950, **17**: 200-14, bibl. 16, illus.
- t STRYDOM, J. C.
Gladiolus.
Fmg S. Afr., 1951, **26**: 95-8, 100.
Notes on cultivation, harvesting and varieties.
- u WYMAN, D.
Spent hops as a mulch.
Brooklyn bot. Gdn Rec., 1950, **6**: 207, illus.
Used for woody plants in the Arnold Arboretum.

SUB-TROPICAL FRUIT AND PLANTATION CROPS.

General.

2888. MAHFUDI, M.

Enige aantekeningen bij nieuwe wijzen van behandelen van pasgemaakte oculaties van citrus, avocado, rambutan and other tropical and subtropical fruit trees. (Some notes on new post-budding treatments for fruit trees.) [English and Javanese summaries 1 p. each.]

Landbouw, 1950, **22**: 544-64, bibl. 3, illus.

Various methods of treating newly-budded plants of citrus, avocado, rambutan and other tropical and subtropical fruit trees were tested at the Ragunan experimental garden, Minggu, in an attempt to obtain good planting material in the shortest possible time. The results obtained with the following 4 methods are described: (1) the Surinam bending method, in which the stock is bent 3 weeks after budding at about 10 cm. above the bud; (2) the modified Surinam bending method, in which the raffia is loosened 10-15 days after budding and tied tightly round the bud shield above the bud, the stock being bent 10 days later; (3) the direct bending method, in which the stock is bent at a height of about 10 cm. immediately before budding; and (4) the lopping method, in which the stock is split about 5 cm. above the bud 3 weeks after budding. The results were promising, but as the methods have not been tested under other conditions they cannot yet be recommended for general use.

2889. HODGSON, R. W., SCHROEDER, C. A., AND WRIGHT, A. H.

Comparative resistance to low winter temperatures of subtropical and tropical fruit plants.

Proc. Amer. Soc. hort. Sci., 1950, **56**: 49-64, bibl. 7.

Exceptionally low temperatures, dropping to about 24° F., were experienced at the University of California, Los Angeles, in the winters of 1947-48 and 1948-49. Meteorological conditions preceding the frosts are described; both winters were characterized by a deficiency in rainfall. Observations are recorded on the behaviour of a wide range of sub-tropical plants. Fruit plants that showed little or no injury were: olive, date, loquat, prickly pear cactus, feijoa (*Feijoa sellowiana*), carob (*Ceratonia siliqua*), kumquat (*Fortunella margarita*), Surinam cherry or pitanga (*Eugenia uniflora*) and certain species of *Persea* (*P. indica*, *P. lingue*, and *P. borbonia* (*palustris*)). Subtropical fruit plants that showed injury ranging from very slight to rather severe were: citrus fruits, avocados (*Persea americana* and var. *drymifolia*), cherimoya (*Annona cherimola*), white sapote (*Casimiroa edulis* and *C. tetrameria*), cattle guavas (*Psidium cattleianum* and var. *lucidum*), macadamia nut (*Macadamia ternifolia* and var. *integrifolia*), African carissa or Natal plum (*Carissa grandiflora*), purple-fruited granadilla (*Passiflora edulis*), kei-apple (*Dovyalis caffra*), mountain

papaya (*Carica candamarcensis*), coffee (*Coffea robusta*), sapodilla (*Achras zapota*) and Pará guava (*Britoa acida*). Tropical fruit plants showing injury ranging from severe to very severe were: papaw (*Carica papaya*), guava (*Psidium guajava*), banana (Cavendish and Lady Finger), rose-apple (*Syzygium (Eugenia) jambos*), West Indian avocado and its relative *Persea schiedeana*, sugar apple (*Annona squamosa*), atemoya (*A. squamosa* × *A. cherimola*) and the related species *A. senegalensis*, and water lemon (*Passiflora ligularis*). The extent and nature of the injury is described in each case. Varietal differences in behaviour are noted for citrus and avocados, and the following factors, among others, that appeared to have affected frost injury are discussed with particular reference to these species: the amount of crop, the rootstock, the degree of pruning the previous season, and tree health and vigour. In general the observations on frost-sensitivity agree with those recorded elsewhere, but a few exceptions among avocado and citrus varieties are noted. Some of the observations tend to support, while others cast doubts on, assumptions regarding the parentage of a number of citrus varieties.

2890. GUILLEMAIN, R., AND ALIBERT, H.
Nouveau procédé de lutte contre les
fourmis arboricoles. (A new method of
controlling ants which infest trees.)
C.R. Acad. Agric. Fr., 1950, 36: 580-1.

Two species of ants found causing damage in North African orchards are *Tapinoma nigerrimum* and *T. simrothi*, the latter particularly in the orange groves and orchards of Algeria. They ascend the trees, devour the young shoots, flowers and fruit and protect the aphids and coccids which are also harmful. The habits of the ants are described. Control can be effected by fixing round the trunks bands of glass wool impregnated with a mixture of DDT 50% 200 g., white oil 100 g. and water 10 l.

2891. KEPNER, R. A.
The principles of orchard heating.
Circ. Calif. agric. Exp. Stat. 400, 1950,
pp. 10, bibl. 7, illus.

The main results are given of orchard heating tests conducted in citrus orchards in southern California during 5 winters (1937-42). Recommendations are made as to types of orchard heater, their placement in the orchard, their burning rates, and border heating. Physical laws of heat transmission and orchard environmental conditions are explained in a simplified manner, with the aid of drawings.

Avocados.

(See also 2888, 2889, 2942, 3091.)

2892. PENCE, R. J.
An anobiid beetle infesting avocado trees.
J. econ. Ent., 1950, 43: 724, bibl. 1, illus.

A note on *Ozognathus cornutus* found in large numbers on avocados without causing any appreciable damage.

Citrus.

(See also 2371, 2421, 2832g, 2888, 2889, 2968a-j, 1, 3090, 3121.)

2893. CUENOT, G.
L'évolution des plantations d'agrumes au Maroc. (The development of citrus growing in Morocco.)

Terre maroc., 1950, 24: 410-13.

The increase in the citrus growing areas and of yields in Morocco from 1928 to 1949 are described and illustrated by graphs.

2894. RUSSO, F., AND TORRISI, M.
Il miglioramento delle nostre varietà di agrumi per selezione di forme derivate da embrioni nucellari. (The improvement of citrus varieties by selecting forms derived from nucellar embryos.) [English summary ½ p.]

Ann. Sper. agrar., 1951, 5: 5-12, bibl. 25.

The subject is reviewed, and experiments started in 1949 at the Fruit and Citrus Experiment Station, Acireale, Sicily, with *Poncirus trifoliata* used as pollinator, are mentioned. The frequent appearance of mutations among the progeny of nucellar origin, and their practical interest, are noted.

2895. RUSSO, F., AND TORRISI, M.
Forme tetraploidi in *Citrus limon* L. e. *C. aurantium* L. (Tetraploid forms in *Citrus limon* L. and *C. aurantium* L.) [English summary ½ p.]
Ann. Sper. agrar., 1951, 5: 13-20, bibl. 15, illus.

A morphological and cytological examination was made of tetraploid forms in a nursery of bitter oranges and in a collection of hybrids. It is advisable to eliminate the tetraploid forms of bitter oranges as rootstocks since they impart weakened vigour to the scion. The tetraploid forms of lemon can, however, be used in crossings with the diploid forms to obtain triploid plants some of which are of horticultural value.

2896. CHAPOT, H.
Un curieux cédrat marocain. (*Citrus medica* Linne.) (A strange Moroccan citron.)
Rev. int. Bot. appl., 1950, 30: 506-14, illus.

This is an account, with a description of the characters of the tree, flowers and fruit, of the cultivation of the citron variety Assads in Morocco.

2897. GONZALEZ, L. G., AND CASAL, C. R.
Top-working pummelo trees by graftinarching.
Philipp. Agric., 1950, 33: 278-84.

A method is described whereby a selected pummelo variety was first inarched on to seedling pummelo, and later, when established, was again graft-inarched to the deheaded stumps of seedling pummelos. This method gave over 83% success compared with 73% for bark grafting and 48% for shield budding on shoots arising from the cut stumps. The average take with scions set in February was about 47%, in March 71%, and in June 87%. The graft-inarched scions grew much faster than the bark grafted or budded scions.

2898. IWASAKI, T.

Effects of double-grafting on the growth of Satsuma orange. I. [Japanese, English summary $\frac{1}{2}$ p.]

J. hort. Ass. Japan, 1950, **19**: 143-9, bibl. 13.

Scions of Satsuma orange were grafted on Satsuma orange, yudzu, and tachibana intermediates on seedling stocks of trifoliate orange. The top-scions assumed the vigour of the intermediate stocks. The heads of trees of top-grafted scions on these three intermediates were compared with others on the vigorous Tanikawa intermediate stocks. The former surpassed the latter in 10 years (end of the experiment), though at first their development was inferior. The stem diameter of the intermediate yudzu was largest of all both before and for several years after it was top-grafted, but later it gradually declined both in stem diameter and in the size of the head. The diameter of the tachibana intermediate was smallest at first, but it gradually outgrew the others and the trees ranked next to those with the Tanikawa intermediate.

2899. SCHNEIDER, H., FOOTE, F., AND MASTERS, L. C.

Avoid sieve tube necrosis when selecting lemon budwood.

Calif. Citrogr., 1951, **36**: 224, 261, illus.

A description is given of a condition of budded lemons in which necrosis of the middle or even the youngest sieve tubes occurs. This may lead to a decline or collapse of the tree. The disease can only be detected with certainty by microscopical examination of sections of the bark. It is suggested that budwood should be taken from old trees known to be free from sieve tube necrosis. C.W.S.H.

2900. TAŠMATOV, L. T.

Trials for raising rootstocks for citrus in Uzbekistan. [Russian.]

Sad i Ogorod, 1951, No. 2, pp. 47-9, illus.

In Uzbekistan (Central Asia) trifoliate rootstocks are unsuitable because they are hydrophilous, sensitive to heat, and require a more acid soil than citrus species. To provide an adequate supply of rootstocks the author describes a method by which the shoots of lemon seedlings pruned back after budding are cut into lengths of 10 to 12 cm. and rooted as cuttings.

2901. COOPER, W. C., GORTON, B. S., AND EDWARDS, C.

Salt tolerance of various citrus rootstocks.

Proc. 5th annu. Rio Grande Valley hort. Inst., 1951, pp. 46-52, bibl. 13.

One-year-old nursery plants of Shary Red grapefruit on 20 different rootstocks were irrigated for 17 weeks with Rio Grande river water to which a 50:50 mixture of sodium chloride and calcium chloride had been added to make a salt concentration of 4,000 p.p.m. Control trees were irrigated with untreated water. The chloride content of the leaves and the severity of injury were used as indicators of salt tolerance. Salt injury symptoms included leaf necrosis, defoliation and terminal shoot necrosis. Moderate salt tolerance was shown by the sour orange, Williams tangelo, Minneola tangelo, Sampson tangelo, Pineapple orange, Cuban shaddock, Nakorn pummelo, Duncan grapefruit, rough lemon, sweet lemon, Columbian sweet lime and

Calamondin. The Cleopatra mandarin, *Severinia buxifolia*, and Rangpur lime were more tolerant than the sour orange, and the Florida sweet orange, trifoliate orange, Rusk citrange and citron less so.

2902. KEBBY, R. G.

Citrus rootstocks influence fruit quality.

Agric. Gaz. N.S.W., 1950, **61**: 574-6.

This paper starts with a statement that the use of *Poncirus trifoliata* as a satisfactory rootstock for Valencia oranges, grapefruit and mandarins has developed rather widely in New South Wales in recent years. It is also now possible to recommend its use for the Washington Navel, but in this case it is necessary to exercise certain precautions to eliminate the occurrence of scaly butt virus. The article itself consists mostly of an extract of one by G. L. Marsh and S. H. Cameron (*Citrus Leaves*, July 1950) on "Orange juice bitterness", in which it is stated that fruit grown on trifoliate orange rootstock produced juice of excellent quality, while the juice from fruit grown on the sour orange and sweet orange rootstocks was only of fair quality initially and developed the stale flavour of preserved juice very rapidly.

2903. MCGILLIVRAY, K. D.

Contour planting on central coast citrus orchards.

Agric. Gaz. N.S.W., 1950, **61**: 281-7, 357-60, 419-23, 457-60, 462, illus.

Factors discussed in relation to contour planting in the central coast citrus orchards of New South Wales include methods of designing a contour-planted orchard, the value and construction of graded drainage banks, the need for conserving organic matter, cover crops, windbreaks, poultry in citrus orchards, mulches, and weed sprays.

2904. OZEROV, G. V.

Effect of light intensity on the growth of lemon seedlings. [Russian.]

Sad i Ogorod, 1951, No. 3, pp. 51-2, illus.

In relation to the trench cultivation of lemons in the dry sub-tropical regions of central Asia, small-scale trials were carried out to ascertain the effect of shading on lemon seedlings during the growing period, using layers of muslin. It was shown that 3 layers had a more beneficial effect than either 2 layers or 1.

2905. DONNELLY, M.

Five systems of citrus soil management.

Calif. Citrogr., 1951, **36**: 138, 158-9.

Five methods are described. (1) Winter cover cropping, summer weed control by tillage. This method is used for erosion control and soil structure improvement. The reduction of the cover in early spring may be done by mowing or discing and summer cultivation is done by heavy discs or spring-tooth harrows. There are many variations, but the modern tendency is to reduce tillage and depth of tillage. (2) Non-tillage, weed-free system. This is carried out by hand hoeing (e.g. in South Africa) or chemical spraying. The system is sometimes supplemented by mulching, but low nitrogen mulches need to be used with caution. (3) Continuous cover cropping. In California the covers are self-seeding annuals which are kept in check by mowing. Undesirable plants, such as Bermuda grass, are eliminated by chemical weed-killers. The system is well

adapted for sprinkler irrigation, but fire and rodent damage are increased. (4) Perennial cover cropping. Bermuda grass (*Cynodon dactylon*) is sometimes used and mowed periodically. The chief disadvantage is water competition between cover and crop. There is also danger of fire and rodent damage. Perennial legumes might be more satisfactory. (5) Continuous clean cultivation by tillage is now largely abandoned. The trees tended to wilt just before each irrigation.

C.W.S.H.

2906. MILLER, M. P.

Soil structure and water penetration.

Calif. Citrogr., 1951, 36: 160-2.

The effect of interrow cultivation in a lemon orchard was noticeable in the growth of an oat crop planted after the trees had been removed. The shortest oats were seen to be in the cultivated interrow strips. Tests made with metal cylinders pressed into the soil and filled with water showed that there were big differences between different parts of the field in the time taken for water to soak into the ground. Where frequent cultivation had been carried out water penetration was slow and it was concluded that such cultivation may result in poor irrigation.

C.W.S.H.

2907. REUTHER, W., AND SMITH, P. F.

Tissue analysis as an aid in evaluating the nutritional status of citrus trees.

Proc. 5th annu. Rio Grande Valley hort. Inst., 1951, pp. 34-45, bibl. 17.

The literature on tissue analysis is reviewed with particular reference to the influence of such factors as leaf age, season, rootstock, scion, and fertilizer treatment on leaf composition. It is also suggested that the analysis of fibrous roots may be of value in evaluating the status of heavy metals and salinity. Data are tabulated comparing the analyses of leaves from some Texas orchards with those from other citrus areas in the U.S. Other points discussed include tentative standards proposed in the literature for classifying the nutrient status of orange leaves, and the collection and preparation of leaf samples.

2908. CHAPMAN, H. D., AND BROWN, S. M.

Analysis of orange leaves for diagnosing nutrient status with reference to potassium.

Hilgardia, 1950, 19: 501-40, bibl. 33.

A detailed investigation has been carried out to determine whether the potassium status of a citrus tree can be determined by leaf analysis. The study has shown that the leaf, of the various plant parts tested, best reflects the varying potassium condition of the nutrient medium. A set of standards based on controlled culture and field experiments has been worked out for three- to seven-month-old spring-cycle leaves, and is thought reliably to indicate the current potassium status of the tree. Detailed directions for sampling, analysis, and interpretation are given. [Authors' summary.]

2909. REBOUR, H.

La fumure des agrumes. Quelques nouveautés en matière d'arboriculture. (Manuring citrus. New methods in fruit-tree growing.)

Tunis. agric., 1950, 51: 77-84, 85-90.

This is a general account of manuring citrus, together

with notes on varieties, propagation, cultivation, irrigation, pruning, phytohormones, and synthetic insecticides. A new method of soil fertilization tried at the Boufarik Station, Algeria, is the use of anhydrous ammonia applied in irrigation water.

2910. DE VASCONCELLOS, P. W. C.

Algumas observações sobre adubações de citrus. (Some observations on fertilizing citrus.)

An. Esc. sup. Agric. "Luiz de Queiroz", Piracicaba, 1949, 6: 13-22 [received 1951].

A citrus orchard on good terra-rossa soil, to which no fertilizers had been applied, showed signs of decrepitude after 12 years. Moderate dressings of N, P and K, together with green manuring, brought it back into regular production. Tables are given showing the yields and amounts of fertilizer applied over a period of 10 years. P was the only element supplied in an amount equivalent to that removed by the fruit. The use of potassium chloride appeared to be detrimental to the flavour of the fruit.

2911. CHAPMAN, H. D.

Reasons for the high nitrogen requirement of citrus in California.

Calif. Citrogr., 1951, 36: 223, 250-3.

High N requirement is considered to be due to (1) irregular root distribution in the between-row areas where cultivation, irrigation and manuring take place, (2) leaching, particularly during the winter rains when absorption by the roots is at a minimum, (3) losses of ammonia by volatilization. Economy might, it is suggested, be effected by applying N in frequent small doses in the irrigation water, replacing furrows by sprinkler irrigation, abandoning the practice of soil cultivation, and slightly acidifying neutral or alkaline soils where volatilization occurs.

C.W.S.H.

2912. HAAS, A. R. C.

Growth-response of lemon and orange trees to phosphate.

Calif. Citrogr., 1951, 36: 137, 166-7, bibl. 3, illus.

Experiments are described in which rooted Lisbon lemon cuttings, lemon cuttings cleft-grafted onto sour orange seedlings, Valencia orange cuttings grafted onto sweet orange seedlings, and Valencia orange budded onto sour orange seedlings were grown in culture solutions and in sand cultures with increasing concentrations of calcium acid phosphate. The responses of the lemons were different from those of the oranges. With lemons growth response occurred both in the low and high range of P supply, while with oranges response was only appreciable in the low range of supply and at high levels N-deficiency symptoms developed. It was concluded that the P requirement of Valencia oranges is not as large as that of Lisbon lemons. C.W.S.H.

2913. CHAPMAN, H. D., AND FULLMER, F.

The potash and phosphorus question.

Calif. Citrogr., 1951, 36: 179, 187, and 226, 238-9, bibl. 13.

Potassium and phosphorus determinations have been carried out in leaf analysis surveys of orange and lemon orchards. K was low in many orchards, but, though fruit size could be improved by applying K, measurable yield increases could not be expected. Only 10% of

orange orchards showed P deficiency, while another 10% showed P excess. Indiscriminate phosphate and potash manuring is dangerous and the best guide is leaf analysis, provided the samples are properly taken. Recommendations are given for the taking of leaf samples for P and K analysis. C.W.S.H.

2914. HAAS, A. R. C.

Leaf symptoms of potash deficiency.

Calif. Citrogr., 1951, 36: 181, bibl. 3, illus.

In controlled cultures K deficiency has not given the same leaf symptoms in the lemon as are produced in the field where other nutrient deficiencies may interfere. Out-of-doors sand and soil-plus-sand cultures with low levels of K or no K and with varying quantities of other nutrients gave a series of leaf patterns which may assist in K deficiency detection in the field. C.W.S.H.

2915. REUTHER, W., AND SMITH, P. F.

A preliminary report on the relation of nitrogen, potassium, and magnesium fertilization to yield, leaf composition and the incidence of zinc deficiency in oranges.

Proc. Amer. Soc. hort. Sci., 1950, 56: 27-33, bibl. 10.

A factorial fertilizer experiment is described involving 3 levels each of N, K and Mg applied to young, bearing Valencia oranges on acid, deep sandy soil in Florida. In the 1948-49 season, increasing rates of N produced a marked increase in yield, a slight increase in tree growth, a slight decrease in fruit size, higher concentrations in the leaves of N, Ca and Mg and lower concentrations of P, Zn and K. Increasing rates of K produced a moderate increase in yield, a slight increase in fruit size, little effect on tree growth or on leaf N or P, but a decrease in leaf Zn, Ca and Mg. Mg had no effect on yield, fruit size or tree growth. After 2 years of differential treatment mild Zn deficiency symptoms appeared, particularly at the higher levels of N and K; Mg again had no effect.

2916. SMOYER, K. M.

The puzzling micro-elements.

Calif. Citrogr., 1951, 36: 134, 152-6.

Zinc, copper, manganese and iron deficiencies found in citrus orchards are described. The first three can be controlled by spraying, but no satisfactory control for iron deficiency has yet been found. Boron toxicity has been recognized in the field but not B deficiency. Neither deficiency nor excess of molybdenum has yet been encountered. C.W.S.H.

2917. SMITH, P. F., AND REUTHER, W.

The response of young Valencia orange trees to differential boron supply in sand culture.

Plant Physiol., 1951, 26: 110-14, bibl. 11.

The object of this study was to maintain trees at different levels of B between the 2 extremes of toxicity and deficiency, and to observe any differences that occurred in growth pattern, mineral composition of the leaves and fruiting behaviour. Twelve young Valencia orange trees on rough lemon stock were grown for 3 years in large outdoor sand cultures. The nutrient solutions contained 3 rates of B: impurity traces only or 0.01 p.p.m., 0.5 p.p.m. and 2.0 p.p.m. No differences in tree size resulted from the different treatments. 10-24-fold differences in the B content of the leaves were induced. The low-B plants showed mild foliage

deficiency symptoms during the second year, while the high-B plants showed slight leaf symptoms of toxicity throughout the 3-year period. In both mature and young leaves, P tended to be present in slightly greater concentration in the presence of low B. In young leaves K accumulation was retarded and Mg accumulation accentuated at the low B level, while the rate of Ca accumulation was depressed at the highest B level. These differences diminished as the leaves approached maturity. The only consistent difference in the quality of the fruit was a slightly lower ascorbic acid content in that of the low B cultures.—U.S. Subtropical Fruit Field Station, Orlando, Fla.

2918. ALDRICH, D. G., VANSELOW, A. P., AND BRADFORD, G. R.

Lithium toxicity in citrus.

Calif. Citrogr., 1951, 36: 266, 281, bibl. 2, illus.

A characteristic mottling was produced by Haas in citrus leaves, over 20 years ago, by the application of lithium salts to soil and sand cultures and in the field. Recently similar symptoms have been produced by lithium salts applied in the greenhouse and in the field, and spectrochemical methods of analysis have made it possible to detect the presence of lithium in the leaves. Similar symptoms have been recognized in the field and have been found to be associated with the presence of lithium in the leaves and in irrigation water. C.W.S.H.

2919. SITES, J. W., AND REITZ, H. J.

The variation in individual Valencia oranges from different locations on the tree as a guide to sampling methods and spot-picking for quality. Part III. Vitamin C and juice content of the fruit.

Proc. Amer. Soc. hort. Sci., 1950, 56: 103-10, bibl. 4.

All the data presented in this series of papers [for Parts I and II, see *H.A.*, 20: 1935 and 21: 961] have been obtained from a single representative Valencia orange tree, growing on rough lemon stock at the Citrus Experiment Station, Lake Alfred, Florida. The vitamin C content of the fruit was found to average 37.1 mg. per 100 ml. of juice. It increased with height at an overall rate of 0.74 mg. per 100 ml. of juice per foot, this being due apparently to the effect of height on light rather than a direct effect of height *per se*. Outside fruit had a higher content than fruit inside the canopy. Colour of the fruit was strongly correlated with the concentration of vitamin C. The data for vitamin C showed a striking resemblance to that reported earlier for soluble solids, and it is therefore recommended that samples be taken from the range of 3 to 6 ft. previously recommended for soluble solids. By contrast juice content showed no marked trends in relation to position on the tree.

2920. PEREAU-LEROY, P.

Observations sur le pollen des agrumes. (Observations on citrus pollen.)

Fruits d'Outre Mer, 1950, 5: 290-3, illus.

This article summarizes results of observations on the morphology and the germination of citrus pollen, with remarks on floral biology of the Clementine orange and on meiosis in the citron Sanguin Panaché.

Percentages of empty pollen grains and of grains germinating are tabulated.

2921. ERICKSON, L. C., AND BRANNAMAN, B. L.
Some effects on fruit growth and quality of a 2,4-D spray applied to Bearss lime trees.
Proc. Amer. Soc. hort. Sci., 1950, **56**: 79-82, bibl. 8.

In a trial in California, lime trees, sprayed with 16 p.p.m. 2,4-D as the isopropyl ester, on 7 June, 1949, about 1 month after heavy spring blossoming, responded with a greater rate of fruit growth as indicated by a size differential of samples picked on 16 August and 12 September. The data are too limited as yet to permit recommendations on commercial treatment.

2922. ERICKSON, L. C.
Overtreatment with 2,4-D.
Calif. Citrogr., 1951, **36**: 268, illus.

When DDT with kerosene for treatment of red scale and 24 p.p.m. of 2,4-D for increasing fruit size were applied together to Washington Navel oranges, symptoms of 2,4-D toxicity were produced. Fruit stems became thick, the rind coarse and navels protruded abnormally. It is thought that the kerosene increased the amount of 2,4-D entering the tissues.

C.W.S.H.

2923. BURDICK, E. M.
Symptoms of freeze damage in citrus fruit.
Proc. 5th annu. Rio Grande Valley hort. Inst., 1951, pp. 117-20, bibl. 3.

In citrus fruit damaged by freezing the most readily recognizable symptom immediately after the freezing is wet or water-soaked section membranes. In slightly damaged fruits these areas dry up within a couple of days and cease to be apparent; in badly damaged fruit, especially grapefruit, they spread until the water marks become visible through the outer peel. In oranges a definite correlation has been found between the formation of hesperidin crystals in radial section membranes and freeze damage. In grapefruit, the corresponding glucoside naringin is rarely seen in crystalline form in frozen fruit. Severely damaged fruit begins to ferment on the third day after the freeze, and most will drop between the fifth and tenth day.

2924. BARTHOLOMEW, E. T., SINCLAIR, W. B., AND HORSPOOL, R. P.
Freeze injury and subsequent seasonal changes in Valencia oranges and grapefruit.
Bull. Calif. agric. Exp. Stat. **719**, 1950, pp. 48, bibl. 15, illus.

Immature citrus fruits injured by frost make a better recovery than do mature or nearly mature fruits; thus, under southern California conditions, Valencia oranges, young lemons, and even grapefruit have a better chance to recover than navel oranges which usually are mature by the time of low temperature. Under the prevailing conditions of spring, summer, and early fall of 1949, mature Valencia fruits in test plots remained on the trees from early May until the middle of August without showing a decrease in quality, but there was a small decrease in quality from the middle of August to 10 October when the fruits were picked. Measurements of specific gravity of the fruit and measurements of juice on both a volume and a weight basis showed

the X-ray and water methods of separation of non-frozen fruits to be more efficient than the separation by hand at the grading belt. Data on the quality and quantity of juice and on sugar content of non-frozen and of frozen fruits are tabulated. Freeze injury, based on number of frozen segments, was much more severe in grapefruits borne on the outside of the tree than in those borne on the inside.

2925. BITTERS, W. P., AND PARKER, E. R.
Horticultural aspects of quick decline.
Calif. Citrogr., 1951, **36**: 222, 264, bibl. 5, illus.

A description is given of attempts to overcome quick decline disease on susceptible budded citrus trees by topworking, inarching and bridgegrafting. Topworking Valencia sweet orange growing on sour orange stock with Eureka lemons was successful provided the whole tree was topworked. If partially worked the remaining diseased part of the tree inhibited the growth of the topworked part. Topworking with grapefruit was not successful in spite of the fact that grapefruit on sour orange stock has not developed quick decline symptoms in commercial plantings. Topworking is unlikely to be widely practised owing to its high cost and because orange areas are not adapted to lemon growing. Sweet orange and rough lemon inarches have been partially successful, the latter being the better. Girdling of the old stem increased both the inarch growth and the response of the tree. Replanting with tolerant combinations is, however, considered more practicable than inarching. Bridgegrafting was unsuccessful.

C.W.S.H.

2926. WALLACE, J. M., AND DRAKE, R. J.
Newly discovered symptoms of quick decline and related diseases.
Calif. Citrogr., 1951, **36**: 136, 168, bibl. 12, illus.

This paper summarizes recent work on quick decline disease in California, lime disease in the Gold Coast, stem-pitting of grapefruit in South Africa and tristeza disease in South America, all of which are now considered to be caused by the same virus. *Aphis citricidus* Kirkaldy, which transmits the disease in other parts of the world, is not known in California, where *A. gossypii* Glover is the vector. It has now been shown that the disease is not only responsible for attacking budded trees of certain stock-scion combinations; the virus is also responsible for specific, but quite different, symptoms on seedlings, and what were previously thought to be distinct diseases are now shown to be differing reactions of one disease in different hosts or host stock-scion combinations. The mottling and vein-clearing which can be induced in lime leaves are now considered to have considerable value in the diagnosis of the disease.

C.W.S.H.

2927. DICKSON, R. C., FLOCK, R. A., AND JOHNSON, M. M.
An insect vector of the citrus quick decline disease.
Calif. Citrogr., 1951, **36**: 135, 169-70, bibl. 4, illus.

Transmission tests have shown that quick decline disease has been transmitted by the melon aphid, *Aphis gossypii* Glover. Serious spread occurs only when

large numbers of aphids are present. Surveys showed that districts where aphids were most numerous had the highest incidence and showed the most rapid spread of the disease. Of 311 other insects tested none showed ability to transmit the disease, though the evidence was inconclusive in the case of certain tree-hoppers. C.W.S.H.

2928. COSTA, A. S., AND GRANT, T. J.

Studies on transmission of the tristeza virus by the vector, *Aphis citricidus*.

Phytopathology, 1951, **41**: 105-13, bibl. 12, illus.

A single adult of *Aphis citricidus*, either the apterous or the winged form, was capable of transmitting the tristeza virus. The percentage of transmission was greater when a good source of inoculum was established and when large numbers of aphids were employed. The sour orange plant was more easily infected with the tristeza virus when inoculated by grafting than by viruliferous aphids. The tristeza virus has been recovered from sour orange plants by grafting, but not by means of the aphid vector.—Instituto Agronômico, Campinas, São Paulo, Brazil.

2929. GRANT, T. J., AND COSTA, A. S.

A mild strain of the tristeza virus of citrus.

Phytopathology, 1951, **41**: 114-22, bibl. 9, illus.

A severe and a comparatively mild form of the tristeza disease of citrus have been transmitted by means of buds and the aphid vector. Evidence indicates that plants invaded by the mild form were protected against the severe form even though the plants were infested several times with viruliferous aphids.—Instituto Agronômico, Campinas, São Paulo, Brazil.

2930. DUCHARME, E. P., AND SCHATZ, A. S.

Sobre la susceptibilidad del pie de pomelo a la "podredumbre de las raicillas" (tristeza). (On the susceptibility of the grapefruit stock to "rootlet rot" ("tristeza").) [English summary.]

Lilloa Rev. Bot., Tucumán, 1949, **21**: 67-75, from abstr. in *Rev. appl. Mycol.*, 1951, **30**: 154.

In tests in insect-free houses and out of doors at the Concordia Experiment Station, Entre Ríos, Argentina, the "tristeza" root rot virus was recovered from sweet oranges grafted on grapefruit stocks, and symptoms were reproduced by grafting on the healthy stocks buds from diseased sweet orange and mandarin trees. Resistance was shown, however, by lemon and grapefruit grafted on grapefruit stocks. On the basis of present evidence, grapefruit should be discarded as a stock for the sweet orange and mandarin.

2931. DRUMMOND, O. A.

Notas sobre o comportamento do "limão rosa" em face da tristeza, verrugose e gomose em Viçosa. (Notes on the reaction of the rough lemon to tristeza, verrucosis and gummosis in Viçosa.) [English summary.]

Lilloa Rev. Bot., Tucumán, 1949, **21**: 1-5, from abstr. in *Rev. appl. Mycol.*, 1951, **30**: 154.

It appears from the results of grafting experiments in Viçosa, Brazil, using limão rosa (limão cravo) [the pink or rough lemon] as a stock for sweet oranges, that the former is reasonably resistant to the tristeza form of root rot and verrucosis (*Sphaceloma fawcetti*) [*Elsinoe fawcetti*] but susceptible to gummosis (58 to 69%), especially the form caused by *Phomopsis* [*Diaporthe*] *citri*.

2932. CHILDS, J. F. L.

The cachexia disease of Orlando tangelo.

Plant Dis. Repr., 1950, **34**: 295-8, bibl. 4.

The symptoms of the disease are described as vein chlorosis, stunting, cankers, phloem discoloration and stem-pitting. There is some evidence that a virus may be the cause, and so it is recommended that buds for propagation be obtained only from healthy trees of seven or more years old.—Bureau of Plant Industry, Orlando, Florida.

2933. OLSON, E. O., AND WAIBEL, C. W.

Studies on the transmission of Rio Grande gummosis of grapefruit.

Proc. 5th annu. Rio Grande Valley hort.

Inst., 1951, pp. 53-9, bibl. 8.

The cause of Rio Grande gummosis is unknown. In inoculation experiments using chips of naturally infected wood, gum and bark it was shown that grapefruit is susceptible and Valencia orange comparatively resistant, but not immune. In grapefruit, inoculum placed deep in the wood reproduced the disease in 90 days, but this did not happen with inoculum placed between the bark and the wood. The disease spread faster in large branches than in twigs. Success in transmitting the disease appeared to vary with the time of year.

2934. FRASER, L.

Phytophthora diseases of citrus during 1950.

Agric. Gaz. N.S.W., 1950, **61**: 588-90.

The diseases of citrus caused by *Phytophthora citrophthora* have been very prevalent in the coastal regions of New South Wales during the past two years owing to high rainfall and long periods of high humidity. The fungus, though normally a soil inhabitant, is, under wet conditions, capable of attacking any part of the citrus tree. Fruit rot, collar rot, root rot, and the results of flooding are described and control measures recommended. To prevent root rot on heavy soils the only safe course is to plant trees on the *Phytophthora*-immune trifoliate stock.

2935. OLSON, E. O.

Tip blight of citrus seedlings in the Lower Rio Grande Valley.

Proc. 5th annu. Rio Grande Valley hort.

Inst., 1951, pp. 72-6, bibl. 4, illus.

A tip blight of citrus plants grown in the seed bed is described, and its resemblance to "stem and tip blight" reported from Palestine is indicated. Pure cultures of a *Phytophthora* sp. were isolated from diseased seedlings and transmitted the disease when inoculated into healthy sour orange and Cleopatra mandarin seedlings. Good drainage is probably the most important control measure, and other tentative control measures are suggested.

2936. FLANDERS, S. E.

The ant as a citrus pest.

Calif. Citrogr., 1951, 36: 267, 281, illus.

The effect of ants on the intensity of mealybug and red scale infestation is discussed with particular reference to the Argentine ant and its spread to South Africa and California. Control of ants has been successful in many cases and has allowed the natural enemies of the mealybugs and scales to reduce the populations of these insects. An instance is given of the successful use of bands of burlap treated with chlordane and wound round the trunks.

C.W.S.H.

2937. PLUMMER, C. C., AND SHAW, J. G.

Toxicity of spray oils to immature forms of citrus blackfly.

J. econ. Ent., 1950, 43: 686-90, bibl. 2.

In experiments at Morelos, Mexico, oils were not toxic to the eggs of citrus black fly, *Aleurocanthus woglumi*, on sour lime trees, but the emerging larvae were affected. The heavier the oil and the higher the concentration, the lower was the survival rate. Spraying foliage before infestation discouraged oviposition, and caused mortality among first instar larvae emerging from eggs laid up to 6 days after spraying.

2938. ATKINS, E. L., Jr.

Fruit tree leaf roller on citrus.

Calif. Citrogr., 1951, 36: 246, 254.

The leaf roller *Archips argyrospila*, first reported in 1935, damages both young spring shoots and blossoms. Two instances of damage to fruit have been recorded. Life cycle studies have indicated that insecticides should be applied immediately after all eggs have hatched—about 15 April. DDT, DDD (TDE) or parathion sprays or dusts are recommended.

C.W.S.H.

2939. LOBSTEIN, J.

Possibilité nouvelle de traitement chimique des cochenilles farineuses (Pseudococcines). (New methods of controlling mealy bugs.)

Terre maroc., 1950, 24: 406-9.

Three species of mealy bug are serious parasites in Morocco, viz. *Pseudococcus citri*, *P. adonidum* and *P. nipae*. An account is given of the citrus mealy bug (*P. citri*) and control trials against it, favourable results being obtained by spraying with "Sulphos" (thio-phosphoric ester) in white oil, the first application being made in May or June.

2940. WENE, G. P.

Control of the Texas citrus mite.

*Proc. 5th annu. Rio Grande Valley hort.**Inst.*, 1951, p. 83.

In dusting experiments against the Texas citrus mite, *Eutetranychus clarki*, quick control was obtained with either 1% EPN (ethyl p-nitrophenyl thionobenzene phosphate) or 10% R-242 (p-chlorophenyl phenylsulphone), but not with sulphur.

2941. ATKINS, E. L., Jr.

Biology and control of orangeworms.

Calif. Citrogr., 1951, 36: 270, 288-91, bibl. 1.

The larvae of *Argyrotaenia citrana* (orange tortrix), *Pyroderces rileyi*, *Holcocera iceryaeella* and *Platynota stultana* are collectively known as orange worms. The tortrix and *Pyroderces* are the most frequently injurious. They feed on the peel and partially in the

pulp, though *Pyroderces* is mainly a scavenging insect feeding on dead flower parts and on scale and aphid exudations. Study of the life histories of these insects has enabled recommendations to be made for protective applications of cryolite, DDT (TDE) or parathion at different times of year depending on the particular orangeworm concerned and the species of citrus being attacked.

C.W.S.H.

2942. DICKSON, R. C.

The Fuller rose beetle, a pest of citrus.

Bull. Calif. agric. Exp. Stat. 718, 1950, pp. 8, illus.

The Fuller rose beetle, *Pantomorus godmani*, a grey-brown snout beetle, about $\frac{1}{4}$ in. long, not only attacks roses, but also citrus, avocados and berry vines. The chief commercial damage it causes is in citrus groves, where it infests foliage and roots. Its life history and habits are described and control methods recommended. The standard control on mature trees has been a 50% cryolite dust applied in late August or early September, and barriers of sticky tree-banding material at least $1\frac{1}{2}$ in. wide have been effective. Recently it has been commonly controlled by either 5% DDT dust or a 0.5% lindane dust. The use of DDT, however, often leads to a build-up of aphids and red spider mites.

2943. FAKUDA, J., AND YOSHIDA, I.

Studies on the effect of a mixture of lime-sulphur and zinc sulphate upon the arrowhead scale. [Japanese, English summary 1½ pp.]

J. hort. Ass. Japan, 1950, 19: 81-97.

The arrowhead scale, *Prontaspis yanonensis* Kuwana, is a serious pest of citrus trees in Japan. Applications of a mixture of lime-sulphur and zinc sulphate have given good control. The mixture has hardly any effect on the adult insect but it is deadly towards the larvae. The scale has 3 generations during the year, and it is recommended that applications against the larvae be made in mid-May, mid-July, and early September.

2944. SMIRNOFF, W.

La "cochenille noire" dans les cultures d'agrumes au Maroc. (The citrus black scale in Morocco.)

Terre maroc., 1950, 24: 457-60, illus.

Notes are given on the world distribution of *Parlatoria ziziphi* and on the occurrence of the pest in Morocco. Its life history is described, and the duration of the four generations at Rabat and of the three at d'Oujda are recorded.

2945. SMIRNOFF, W.

La cochenille "Serpette" dans les cultures de citrus au Maroc (Biologie). (The scale insect *Lepidosaphes gloveri* in Moroccan citrus plantations. (Biology.))*Terre maroc.*, 1950, 24: 281-3, illus.

This scale is widely distributed in Morocco where it is a serious pest of citrus. Its life-history, and the duration of the generations in two regions, are given, with notes on its parasites and predators.

2946. FISHER, F. E., AND GRIFFITHS, J. T., Jr.

The fungicidal effect of sulfur on entomogenous fungi attacking purple scale.

J. econ. Ent., 1950, 43: 712-18, bibl. 12.

From studies in Florida on natural control of purple

scale, *Lepidosaphes beckii*, by entomogenous fungi it is concluded that wettable sulphur is to be preferred to lime-sulphur or sulphur paste for the control of rust mites, *Phyllocoptura oleivora*, on citrus.

2947. CRESSMAN, A. W., MUNGER, F., AND BROADBENT, B. M.

Effectiveness of different concentrations of parathion alone and of oil with parathion to control California red scale.

J. econ. Ent., 1950, 43: 610-14, bibl. 7.

On lemon trees sprayed in September 1948 and June 1949 with 1.0, 1.5 and 2.0 lb. of 25% parathion per 100 gal., the highest concentration reduced infestation by the California red scale, *Aonidiella aurantii*, in September 1949 to about 10% of that following the 1.0 lb. applications. Added to special light or medium oils, parathion at 0.5 lb. per 100 gal. with 1% oil was more effective than 1.75% medium oil alone, while increasing parathion to 1.0 lb. greatly increased effectiveness. Parathion also gave good control of citrus mealybug but not of citrus red mite. Soft brown scale was increased by parathion alone. No apparent injury to trees was observed by parathion alone, but in those cases where oil alone caused some leaf or fruit drop, or dieback, this was increased by the addition of parathion. Addition of 2,4-D practically eliminated leaf drop in lemons, but was not so effective in oranges.

2948. WENE, G. P.

Use of cyanamid defoliant as a control for California red scale.

Proc. 5th annu. Rio Grande Valley hort. Inst., 1951, p. 84.

Experiments with the cyanamide defoliant dust used on cotton have shown that it is of no value as a control for California red scale, *Aonidiella aurantii*.

2949. Tosco, U.

Alcuni dati sulle avarie degli agrumi che giungono a Torino, in rapporto alle varietà commerciali tipiche, ed indagini sulle ragioni della loro maggiore resistenza ed immunità al momento dell'arrivo. (Data on the damage to citrus fruits of typical commercial varieties arriving at Turin market, and observations on the recent improvement in their condition.) [English and French summaries 8 lines each.]

Riv. Fruttic., 1951, 13: 73-103, bibl. 8.

This is a statistical study of the citrus fruits arriving annually on Turin market, in relation to damage. Of the annual average of 350,000 quintals of fruit arriving during 1946-49, the average annual quintals of damaged fruit was 14,530, in 1949 the loss was 12,641 and in 1950 only 3,000. This improvement is due to the reorganization of the transport systems, to improvement in packing, and probably to better methods of picking.

2950. GOIDANICH, G., AND PUPILLO, M.

La membranosis dei frutti di limone. (Membranosis of lemon fruits.)

Riv. Ortoflorofruttic. ital., 1951, 35: 66-9, bibl. 3, illus.

In the disorder described the membranes or carpellary walls are marked with brown spots of variable form—triangular or irregularly quadrangular, or in long

stripes. In severe cases the whole of the membrane is affected. The amount and quality of the juice remains unchanged.* The disorder depends to some extent on storage conditions. Fruit kept at 0° C. for 1 or 2 weeks and then transferred to 10°-15° C. showed fewer membrane spots than those kept at 10°-15° C. continuously. Fruit kept at 4°-5° C. for 1 or 2 weeks and then at 10°-15° C. showed more membranosis than those kept throughout at 10°-15° C. Fruit kept for 21 hrs. at 37° C. and then stored at 4.4° C. showed less membrane spotting than that placed immediately at 4.4° C.

2951. HALL, E. G., AND LONG, J. K.

Citrus wastage investigations.

Agric. Gaz. N.S.W., 1950, 61: 631-5, 662.

Investigations at the Gosford Citrus Processing Research Laboratory showed large variations in wastage, due to green mould (*Penicillium digitatum*) and stem-end rots (mainly *Phomopsis citri*) between oranges from different orchards in the Gosford district. Careful handling and improved processing methods have been shown greatly to reduce wastage due to green mould, but have been less effective on wastage due to stem-end rots, the control of which is primarily an orchard problem. Wastage due to green mould and stem-end rot and shrivelling have been much reduced by dipping the fruits after harvest in a wax emulsion containing sodium salicylanilide.

2952. DICKINSON, D., AND HARRIS, F. J. T.

Paper test for citrus juices.

Analyst, 1950, 75: 687-8, bibl. 1.

Citrus juices absorbed on filter paper produced a yellow band when treated with dilute sodium hydroxide, which distinguished them from the juices of other fruits tested.

Dates.

(See also 2968k.)

2953. MONCIERO, —

Contribution à l'étude du palmier dattier. 1. Premiers résultats d'essais de fumure et de ciselage. 2. Fécondation mécanique des palmiers dattiers. (A study of the date palm. 1. First results of manuring and thinning trials. 2. Mechanical fertilization of date palms.)

Ann. Inst. agric. Algér., 1950, 5: 6: 1-12, illus.

The results of applying NPK and O (organic manures) are tabulated. NPKO and PKO showed significantly diminished yields, NPO, KO, NO, O, and NKO gave no significant differences from control, but NKO was significantly superior to NPO. Thinning induced a yield of marketable fruit equal to that of controls and of improved quality. A method of pollinating the date palm by using a knapsack dusting apparatus is described.

2954. MALENÇON, G.

Le "bayoud": maladie fusarienne du palmier-dattier en Afrique du Nord. (Bayoud: a fusarium disease of the date palm in North Africa.)

Fruits d'Outre Mer, 1950, 5: 279-89, bibl. 17, illus.

Bayoud is a disease caused by *Fusarium albedinis* which enters the date palm through the roots, or less commonly through the flowers, to cause fatal vascular infection. The history, parasite, infection, symptoms, epidemiology and control are described. Control measures are discussed with reference to soil disinfection, injection of stems, and raising resistant varieties. Promising results are recorded from introducing Cryptonol, a preparation of oxyquinoline sulphate, through holes in the stem.

2955. RESIDENCE GÉNÉRALE DE LA REPUBLIQUE FRANÇAISE AU MAROC.
Études entreprises pour la défense des palmiers-dattiers dans le sud Marocain.
(Studies on the protection of date palms in south Morocco.)
Reprinted from *Bull. Inf. Maroc.*, 1948, No. 24, pp. 7 [received 1951].

Promising results in the control of the "bayoud" disease by injections of an oxyquinoline salt are reported.

Litchi.

(See also 2572.)

2956. EVREINOFF, V. A.
Le litchi. (The litchi.)
Fruits d'Outre Mer, 1950, 5: 325-33, bibl. 9, illus.

This is an account of *Litchi chinensis* discussed under: origin and distribution, characters, cultural requirements, reproduction (by seed, layering and grafting), planting, yields, times of fruit maturity, gathering and storing, varieties, and pests.

2957. NAKATA, S.
Blossom-bud formation in the litchi.
Bien. Rep. Hawaii agric. Exp. Stat. 1948-50, 1951, pp. 131-3, bibl. 1, illus.

Fertilizer applications and irrigation were controlled in 2 experiments between August and December to induce litchi trees to make either one or two flushes of growth. Trees making one growth flush produced significantly more growth terminals than those making two flushes. Spraying with 400 p.p.m. sodium naphthaleneacetic acid in October-November caused significant reductions in the number of blossom terminals.

Passion fruit.

(See also 2889, 3110.)

2958. CILLIE, G. G., AND JOUBERT, F. J.
Occurrence of an amylopectin in the fruit of the granadilla (*Passiflora edulis*).
J. Sci. Food Agric., 1950, 1: 355-7, bibl. 12, illus.

The starch present in the fruit pulp of the granadilla (*Passiflora edulis*) has been isolated and examined. Its properties are in accord with its formulation as an amylopectin in which the side chains have an average length of 17 glucose residues. [Authors' synopsis.]

Persimmons.

2959. SLATE, G. L.
Persimmons, a promising neglected fruit.
Proc. 40th annu. Mig north. Nut Grs'
Ass. 1949, Beltsville, Md, 1950, pp. 154-7.

A brief account, with notes on propagation and cultivation, of the early ripening persimmons Garretson, Early Golden, Josephine and Kitch, which are being grown at Geneva, New York.

2960. MORI, H., AND HAMAGUCHI, K.
Some experiments on commercial hand pollination of kaki (Japanese persimmon).
[Japanese, English summary $\frac{1}{2}$ p.]
J. hort. Ass. Japan, 1950, 19: 98-106
bibl. 11.

Some of the chief kaki varieties have no male flowers and rarely set seed by parthenocarp. To ensure fruit set of such varieties, hand pollination is recommended. Pollen can be collected, either by protecting the flowers against scattering their pollen by using paper bags or by collecting the flowers the day before they are likely to open and keeping them indoors until the next day, when anthesis occurs. Stored pollen was viable for about 5 days at room temperature, but lower temperatures were preferable, while a higher temperature (30° C.) was injurious.

Tung.

(See also 2421, 2567, 3130, 3137.)

2961. MERRILL, S., AND BROWN, R. T.
Inheritance of height of head in tung trees.
Proc. Amer. Soc. hort. Sci., 1950, 56: 185-90, bibl. 2.

1. Seedlings from selfed and open-pollinated seed of five low-headed and five high-headed tung clones and of crosses between the low-headed and high-headed clones could all be classified into two types, high-headed and low-headed. In the low-headed type the first branch appeared between the 11th and the 24th nodes, and in the high-headed type between the 26th and 42nd nodes. 2. The high-headed character behaved as a Mendelian recessive, allelomorphous to the low-headed character. Dominance appeared to be incomplete. Evidence of hybrid vigour was not conclusive. 3. Head height was inherited from both the pollen and pistillate parents, showing that the egg was fertilized and no apomictic seed was produced. [Authors' summary.] —U.S. Dep. Agric., Bogalusa, La.

2962. NEFF, M. S., AND O'ROURKE, N., JR.
Factors contributing to superior growth and yield of vase type tung trees.
Proc. Amer. Soc. hort. Sci., 1950, 56: 181-4, bibl. 4.

In a training experiment at Cairo, Georgia, started in 1940 and described in earlier papers [see *H.A.*, 11: 900 and 17: 381], vase- (bush) type tung trees have grown larger and yielded better than natural head (single trunk) trees. The present paper reports observations made to determine the fundamental reasons for the difference in performance of the two types of tree. It is concluded that the shade cast by the low-hanging branches of vase-form trees reduces competition from grass and weeds, thus decreasing the need for cultivation

and conserving soil moisture. The development of a dense surface fibrous root system is promoted. The same advantages accrue to varieties such as Lampton and Isabel which are naturally low-branching.

2963. NEFF, M. S., AND O'ROURKE, E. N., Jr.
Further studies of factors affecting growth
of newly planted tung trees.
Proc. Amer. Soc. hort. Sci., 1950, 56:
191-6, bibl. 5.

The following treatments were applied at transplanting on 16 March to 1-year-old seedling tung trees: planting at normal depth *versus* planting 12 to 16 in. deeper than usual; thorough cultivation *versus* a millet cover crop sown on the same date. Each tree received $\frac{1}{2}$ lb. 6-8-6 fertilizer, but with the deep planted trees half received it at the bottom of the planting hole and half on the surface after the hole was filled. By late May, when drought occurred, cover crop competition had become so detrimental to tree growth as to mask any effect of other treatments. The most significant effect of deep planting was an apparent failure during June of the surface manured trees to obtain sufficient fertilizer. By the end of the growing season there was no appreciable difference among treatments in the distribution of fibrous roots in the soil; in every case nearly half these roots were found in the top 6 in. of soil.—U.S. Dep. Agric., Cairo, Ga.

2964. DROSDOFF, M., AND LAGASSE, F. S.
The effect of some magnesium and calcium
fertilizers in a magnesium deficient bearing
tung orchard.
Proc. Amer. Soc. hort. Sci., 1950, 56:
5-11, bibl. 4.

Widespread Mg deficiency has been found in tung orchards on sandy soil in Florida. Sixteen treatments involving soil applications of Mg in various forms and amounts and an untreated control were started in an orchard in 1944 and continued for 5 years. Treatments involving Ca were most effective in increasing yields. These, on a per tree basis, included 14 lb. dolomite limestone+4 lb. sulphur, 3.5 lb. dolomite+1 lb. S, and 2 or 4 lb. Epsom salts+4 lb. gypsum. Dolomite without S was relatively ineffective even after 5 years with 14 lb. per tree per annum; the possibility that S was an important factor was checked but with negative results. The application of 2.8 lb. per tree per annum of calcined magnesite (92% MgO) produced the greatest increase in leaf Mg after 3 years and the most effective reduction of deficiency symptoms, but it did not wholly remove these in severe cases even after 5 years, nor did it increase yields as much as the dolomite+S treatments. Sulphate of potash-magnesia produced some improvement but less so than Epsom salts with a similar MgO value. The effects of the treatments on leaf contents of N, P, K, Ca, and Mg are tabulated and discussed.

2965. CASTAGNOL, E. M., CHAVANCY, A., AND BILLAUX, P.
Étude des floraisons et fructifications des
Aleurites montana et *fordii*. (A study of the
flowering and fruiting of *Aleurites montana*
and *A. fordii*.)
Arch. Inst. Rech. agron. Indochine, 1950,
No. 3, pp. 30.

This is an account of observations made at the experimental centre at Blao (Haut-Donnai) and at the experimental station of Xiêng-Khouang (Trân-Ninh). It was found that climatic conditions had a marked effect on the flowering of *Aleurites montana* in relation to its duration and to the type of inflorescences. In the north of Indo-China flowering is of short duration (1½ months), in the south 5 to 6 months. In the north there is a marked distinction between the male and female flowering. Trees producing only ♀ flowers form more than 40% of the plantation at Xiêng-Khouang; here mixed inflorescences are relatively rare, while at Blao they are the most numerous. The different climates seem to have little effect on the fertilization of the flowers and the development of the fruit. At the Xiêng-Khouang station the times of flowering of the two species were recorded. *A. montana* flowers during March and April, the maximum occurring about mid-March; in *A. fordii*, flowering is concentrated in March, the maximum occurring near the beginning of the month.

Other crops.

2966. COIT, J. E., AND MILLER, W. W.
What about the macadamia?

Calif. Citrogr., 1951, 36: 300-2, illus.

It is suggested that, on foothill soils where avocado pear trees have been killed in patches by "slow decline" disease, macadamia nut trees might be planted in the vacant spaces. The trees are not subject to diseases or pests and the nut is in demand. The oil content is 70%. C.W.S.H.

2967. CARRA, —.
L'affinité de *Pistacia vera* sur *Pistacia atlantica*. (The compatibility of *Pistacia vera* on *P. atlantica*.)
Ann. Inst. agric. Algér., 1950, 5: 2: 1-4.

The successful graft unions obtained with these species indicate that they are mutually compatible and that *Pistacia atlantica* can be used as a rootstock for *P. vera* (the pistachio nut).

Noted.

2968.
a ADRIANCE, G. W.
Observations on the citrus industry of Italy.
Proc. 5th annu. Rio Grande Valley hort. Inst., 1951, pp. 85-97, bibl. 6.
See *H.A.*, 20: 3109.
b BAINES, R. C.
Nematodes on citrus.
Reprinted from *Calif. Agric.*, 1950, 4: 8: 7
in *Proc. 5th annu. Rio Grande Valley hort. Inst.*, 1951, pp. 60-2, illus.
See *H.A.*, 20: 3163.
c CHRISTIE, J. R., AND OWEN, J. H.
Occurrence of black rot of oranges in Florida.
From abstr. in *Phytopathology*, 1951, 41: 7.
Inoculation tests with *Alternaria citri*.

- d DEBACH, P.
Possibilities in biological control of citrus pests.
Proc. 5th annu. Rio Grande Valley hort. Inst., 1951, pp. 77-80, bibl. 5.
- e FLANDERS, S. E.
Races of apomictic parasitic Hymenoptera introduced into California.
J. econ. Ent., 1950, **43**: 719-20, bibl. 17, illus., being *Pap. Calif. Citrus Exp. Stat.* 643.
For the biological control of scale insects on citrus.
- f FRIEND, W. H.
The Joppa orange.
Proc. 5th annu. Rio Grande Valley hort. Inst., 1951, p. 63.
- g JOURDAIN, E.
Les agrumes dans les possessions britanniques de la Caraïbe. (Citrus in the British possessions in the Caribbean.)
Fruits d'Outre Mer, 1950, **5**: 365-74.
- h LAFOLLETTE, J. R.
Citrus pest control in 1949-1950.
Calif. Citrogr., 1951, **36**: 138, 162-6.
- i NAKAMURA, M.
Cytological studies in the genus *Citrus*. III. Further data on chromosome numbers.
J. hort. Ass. Japan, 1942, **13**: 30-40, from abstr. in *Heredity*, 1950, **4**: 399.
- j NESTERENKO, G. A.
Growing citrus in trenches. [Russian.]
Sad i Ogorod, 1951, No. 2, pp. 43-7.
- k OSIPOV, I. G.
The date palm in the Turkmen S.S.R. [Russian.]
Sad i Ogorod, 1951, No. 3, pp. 49-50, illus.
- l ROHRBAUGH, P. W., AND MAXWELL, N.
Present status of citrus trees damaged by the freeze of January 30, 31, 1949.
Proc. 5th annu. Rio Grande Valley hort. Inst., 1951, pp. 109-16, illus.

TROPICAL FRUIT AND PLANTATION CROPS.

General.

(See also 2888, 2889, 2890, 3110, 3121.)

2969. DE POERCK, R.
Les facteurs de la production végétale dans la culture équatoriale vus sous l'angle de l'amélioration. (Factors affecting plant yields in the tropics from the point of view of improvement.) [Flemish summary 1 p.]
Bull. agric. Congo belge, 1950, **41**: 879-920.
- These factors are discussed in relation to (1) cultural, economic, genetical and physiological conditions, (2) the morpho-physiological relations between the aerial and subterranean organs of the plant, (3) the aerial plant organs and their functions, and (4) the subterranean organs and their functions.
2970. PAPPY, H. R.
Les plantes utiles de Tahiti et des établissements français de l'Océanie. (The useful plants of Tahiti and of the French colonies in the Pacific.)
Rev. int. Bot. appl., 1951, **31**: 94-113, bibl. 16.
The plants mentioned include coconut (*Cocos nucifera*), *Vanilla* spp., bread fruit (*Artocarpus incisa*), taro (*Colocasia antiquorum*), banana (*Musa* spp.), sweet potato (*Ipomoea batatas*), bamboo (*Schizostachyum glaucifolium*), various vegetables and fruits, coffee, tobacco, cassava and sugar cane.
2971. TERRA, G. J. A.
Gewassen voor de bergstreken. (Crops for the tropical highlands.) [English and Javanese summaries 1 p. each.]
Landbouw, 1950, **22**: 419-52, bibl. 24, illus.
Data are given on the climate of the mountainous regions of Indonesia and on the crops which are grown in the dry highlands and the wet highlands. Köppen's classification of climatic regions is then described, and it is concluded that this may form a useful, but limited,

guide to the selection of districts from which plants may be introduced into tropical highlands. The factors that may give rise to physiological problems when introducing crops from non-tropical regions include short daylength, an uninterrupted growing period and a mean temperature of 15-20° C. without much variation. The possibilities of introducing annuals, biennials, perennials, grapes, apples, olives and figs are discussed in turn.

2972. ACCORSI, W. R.
Características morfológicas, anatómicas e citológicas da epiderme inferior da folha das Rubiaceae. (Morphological, anatomical and cytological characteristics of the lower epidermis of the leaf in Rubiaceae.)
An. Esc. sup. Agric. "Luiz de Queiroz", Piracicaba, 1949, **6**: 23-51, bibl. 9, being summary of paper in *Rev. Lilloa*, **16**: 5-59 [received 1951].
- A study was made of 24 characteristics of the lower epidermis of the leaf of 517 species of Rubiaceae, from 108 genera. The genera include some horticultural plants, such as *Cinchona* and *Coffea*. Lists are given showing (a) the percentage of species in which each character occurs and (b) the characters that occur in each species.
2973. ZAMBETTAKIS, C.
Lasiodiplodia theobromae (Pat.) Griff. et Maubl. Pourriture noire des plantes tropicales.—Die back. (*Lasiodiplodia theobromae* (Pat.) Griff. and Maubl. Black rot of tropical plants.—Die-back.)
Rev. Mycologie, Suppl. colon., 1950, **15**, **1**, Suppl. **1**, pp. 7, illus., from abstr. in *Rev. appl. Mycol.*, 1951, **30**: 181.
- An account is given of *Lasiodiplodia* (*Botryodiplodia*) *theobromae*, and the black rot or die-back diseases it causes in tropical plants, including the mode of

penetration and infection of banana, tea, and cacao pods, transmission, characters of the fungus, and preventive measures for the principal crops attacked.

2974. MALLAMAIRE, A.

Les principaux insectes nuisibles et les maladies cryptogamiques des oléagineux alimentaires en Afrique noire. (The principal pests and diseases of the food oil plants of tropical Africa.)

Agron. trop., 1950, 5: 384-96, bibl. 63, illus.

This is an account of pests and diseases of groundnut, oil-palm, coconut palm, the shea-butter tree (*Butyrospermum parkii*), sesame, and watermelon. The most important parasites of *Butyrospermum* are three species of *Loranthus*, that invade the branches and finally kill them.

2975. COHIC, F.

Les insectes nuisibles aux plantes cultivées dans les Wallis et Futuna. (The insect pests of plants cultivated in the Wallis and Futuna Islands.)

Agron. trop., 1950, 5: 563-81, illus.

The plants mentioned include, for Wallis: coconut, banana, citrus, coffee, cacao, tobacco, taro (*Colocasia esculenta*), yam, eggplant, tomato, and melon; for Futuna: coconut, orange, banana, taro, and bread-fruit (*Artocarpus incisa*).

2976. FRANSSEN, C. J. H.

Insectenbestrijding met HCH-bevattend smeersel. (Insect control with BHC-banding.) *Landbouw*, 1950, 22: 565-6.

BHC (2% gamma isomer) was mixed at the rate of 5% with a high melting point vaseline (Shell Otina Compound C Petrolatum F₁₁) and the mixture smeared round the trunks of coconut palms on the Sangehe and Taland islands. All young locusts that passed over the smears were dead within a few hours. Under field conditions the smear lost its activity after a few months. In Makassar the smear was tested for the control of ants and was found to be very effective when used on bushes. The BHC had a repellent effect, so that the ants that were not killed by contact died of starvation. When smeared on the staging of an orchid house, the preparation kept the plants free from ants which had previously been causing damage by cultivating scale insects. Pot plants of *Eugenia* were also kept free from scale insects by a smear of BHC round each pot, which had a repellent effect on the ants. No damage was observed on coconut or mango trees as a result of this treatment.

2977. GONZÁLEZ MENDOZA, R.

Clordano insecticida eficaz para el control de la hormiga arriera. (Chlordane, an effective insecticide for control of leaf-cutting ants.) *Bol. inf. Colombia*, 1950, No. 12, pp. 24-7, bibl. 5.

74% chlordane, used as a 0.1% aqueous emulsion, gave complete control of leaf-cutting ants (mainly *Atta* spp.) when applied through holes bored into the nests. From 12 to 100 l. emulsion were required per colony, depending on its size. The effectiveness of the treatment was found to depend largely on accurate localization of the central colony and the principal nests.

2978. PANGGA, G. A.

A preliminary report on the biology, ecology and control of the giant African snail (*Achatina fulica* Fer.).

Philipp. J. Agric., 1949 (published 1950), 14: 337-48, bibl. 5, illus.

A giant African snail was apparently introduced to the Philippines by the Japanese army in 1942. It now attacks citrus, coffee, papaws and many other plants but shows a particular preference for succulent vegetables and ornamentals. Studies on its biology are described. For control the snails can be collected by hand or poisoned by metaldehyde-bran baits.

Bananas.

(See also 2257, 2973, 2975, 3088 l, 3101, 3103.)

2979. MARTYN, E. B., AND McILWAINE, A.

Banana leaf spot disease control in Jamaica. *Bull. Dep. Agric. Jamaica* 46, [undated, probably 1950], pp. 30, illus.

Following a brief account of the history of, and research on, banana leaf spot or sigatoka disease (*Mycosphaerella musicola*—*Cercospora musae*), the organization set up to combat the disease on an island-wide scale is described in detail under the following main headings: Staff, registration of growers, classification of growers, spraying materials, spraying equipment (7 types of spray pump), the spraying operation, fruit washing and costs. A total of perhaps rather more than 50% of the bananas grown are sprayed. Factors influencing the incidence of the disease are indicated.

2980. BENSAUDE, M., AND JENKINS, A. E.

An obscure disease of banana.

From abstr. in *Phytopathology*, 1951, 41: 3.

During 1949-50, field and laboratory observations on St. Michael Island, Azores, confirmed that a "verruca" or wart disease of banana may be caused by a parasite which produces abundant inoculum, and which simulates, in its symptoms and association with humid conditions, a *Sphaceloma* disease.

2981. VILARDEBO, A.

Conditions d'un bon rendement du piégeage de *Cosmopolites sordidus*. (Conditions for the effective trapping of the banana borer.) *Fruits d'Outre Mer*, 1950, 5: 399-404.

The trials here recorded indicate that, for effective trapping of the banana borer [*H.A.*, 19: 3445], the necessary conditions are (1) using at least one trap per tree, (2) daily collection of the trapped weevils, (3) the use of trapping throughout the whole year.

2982. MAYMONE, B., AND TIBERIO, M.

Ricerche sulla composizione chimica, sulla digeribilità e sul valore nutritivo di alcuni cascami della coltivazione dei banani (*Musa sapientum* L., *M. cavendishii* Lamb., ecc.). (The chemical composition, digestibility and nutritive value of some banana residues.) [English summary 1 p.] *Ann. Sper. agrar.*, 1951, 5: 133-56, bibl. 3.

A chemical study is described of green immature sun-dried bananas, green banana skins, yellow banana skins and skins of bananas in an advanced state of ripeness. Among other information the vitamin content of fresh banana skins is given.

Cacao.

(See also 2973, 2975, 3140.)

2983. BROUHNS, G.

Quelques considérations sur la culture du cacaoyer au Congo belge. (The cultivation of cacao in the Belgian Congo.) [Flemish summary 1½ pp.]

Bull. agric. Congo belge, 1950, 41: 925-92, bibl. 40.

The factors relative to cacao growing in the Belgian Congo are discussed under: (1) The introduction of cacao into Africa and to the Belgian Congo. (2) The variations in yield. (3) The morphology and anatomy of the cacao plant. (4) The requirements of cacao (with reference to soil, water, and shade).

2984. LEON, J.

Una especie nueva de *Theobroma*. (A new species of *Theobroma*.)

Bol. téc. Inst. interamer. Cien. agric. Turrialba 2, 1949, from abstr. in *Bol. inf. Colombia*, 1950, No. 7, p. 8.

A new species of *Theobroma*, which has been called *T. mammosum*, is described. It was found in the Atlantic region of Costa Rica, a district of heavy rainfall and high temperatures. The species does not appear to have any commercial value.

2985. ROSENQUIST, E. A.

Cocoa selection and breeding in Malaya.

Malay. agric. J., 1950, 33: 181-93, bibl. 15.

An account is given both of the cocoa trees imported long ago and now found scattered throughout Malaya, and also of recent importations. Selection is now being undertaken with trinitario, criollo and West African amelonado cocoa. Trinitario selections are being made mainly from two plots planted on experimental stations in 1934 and 1937. Twenty self-compatible trees were selected, mainly on yield; bean size was unfortunately below average throughout the population. Clonal material has been propagated by fan cuttings and two clonal trials have been planted. A clonal multiplication nursery has been established. Crossing of selected trees has started, and seven legitimate progenies have been included in a trial comparing local trinitarios with imported amelonado cocoa. C.W.S.H.

2986. THOMPSON, A.

The introduction of amelonado cocoa from the Gold Coast to Malaya.

Malay. agric. J., 1950, 33: 209-18, bibl. 1, illus.

Packing, transport and subsequent sowing in an isolation nursery of over 5,000 amelonado seeds from the Gold Coast is described. Unsterilized charcoal was used as packing material in all but two tins. The moisture content was raised above the recommended 35-40%, because of the extreme dryness of the air at the time of packing. Two parts of saturated charcoal were mixed with nine of dry charcoal. Two tins were filled with damp vermiculite instead of charcoal. Care was taken to see that the seeds were carried with pointed ends uppermost. Transport by air took 9 days. Germination was 100%, though the vermiculite packed seeds had short hypocotyls. Growth in baskets in the

isolation nursery was good. At 6 months the plants were declared free from disease, and 4,956 plants were distributed in Sarawak, North Borneo and Malaya. A short account is given of a collar rot (*Marasmius semiestius*) of seedlings and some insect pests troublesome in the nursery. C.W.S.H.

2987. BERWICK, E. J. H.

Further investigations into the growing of cocoa in Malaya.

Malay. agric. J., 1950, 33: 194-208, bibl. 5, illus.

This is a further report on trials being carried out to determine whether cocoa can be grown as a commercial crop in Malaya. Raising seedlings as basket plants has been satisfactory, though expensive. Sowing seed at stake has not so far been satisfactory owing to rat and ant damage and poor growth after establishment, but trials continue, as this method, if successful, would be cheap. Transplanting seedlings from beds is also being tried. Propagation by cuttings and buddings has presented no difficulty and overhead sprays are now being used for the cuttings. Buddings have been forced to shoot by bending over and pegging down the stock. In field trials in cleared areas, leguminous bush covers were found to retard growth and encourage insect pests. Replacement by palm frond shade caused an immediate increase in growth and prevented further attack by night-flying cockchafers (chiefly *Apogonia* sp.). Cocoa established in jungle areas has made good growth and the best method of thinning the jungle trees and maintaining adequate shade is being studied. Cocoa planted in mature rubber has failed to become established. Trials have been planted in which cocoa has been interplanted with young coconuts, oil palms and hedge-planted rubber. C.W.S.H.

Cinchona.

(See also 2972.)

2988. CRANDALL, B. S.

Cinchona root and collar rot in Peru and Bolivia.

Circ. U.S. Dep. Agric. 855, 1950, pp. 16, bibl. 19, illus.

A root disease of the ledgeriana form of *Cinchona officinalis*, caused by *Phytophthora quininea*, was found in two plantations and their nurseries in Peru. Attack by the pathogen in the plantation was the result of a predisposing condition provided by deep-hole planting. Control of the disease has been moderately successful by modifying nursery practices and planting methods. Selection of ledgeriana varieties resistant to the disease offers promise.

2989. CRANDALL, B. S.

Coffee and cinchona damping-off controlled by post-germination seedbed treatment.

Plant Dis. Repr., 1950, 34: 263.

Effective control of damping-off of coffee seedlings was obtained by weekly treatments with wettable Spergon (48% t.p.b.) or Yellow Cuprocidate started as soon as the disease was observed. Entire beds were treated by sprinkling the fungicide from a water-can. Damping-off of cinchona seedlings (*C. pubescens* and *C. officinalis*) was controlled as soon as it was observed by

localized area treatments of wettable Spergon applied with a pressure sprayer or by sprinkling at about the rate of 1 gram to 1 pint of water per square foot, followed by a clear water rinse.—Centro Nacional de Agronomía, El Salvador.

2990. SZKOLNIK, M.

Nematode root knot of cinchona in the western hemisphere.

Plant Dis. Repr., 1950, 34: 305.

Records of the occurrence of nematode root knot of cinchona in the eastern hemisphere are reviewed, and its occurrence in two plantations in Guatemala is described.

Coconuts.

(See also 2974, 2975.)

2991. GOPALAN, K.

The supply of coconut oil.

Indian Coconut J., 1950, 3: 193-204.

An account is given of the factors which have led to the present general shortage of oils and fats. Particular attention is given to the coconut oil requirements of India. Some coconut oil was exported until 1924, but thereafter India became an importer. In recent years she has found it increasingly difficult to obtain her requirements owing to decreased production (due to the war) in neighbouring exporting countries.

C.W.S.H.

2992. ANANDAN, A. P., SANKARASUBRAMONY, H., AND PANDALAI, K. M.

A note on the growth of coconut seedlings in relation to soil fertility.

Indian Coconut J., 1950, 3: 205-9, bibl. 1.

An experiment is described in which a very even batch of seedlings from high-yielding parents was planted in an area where there were distinct gradients both in the physical and chemical properties of the soil. The growth rate of the seedlings was reduced as the N and K₂O content of the soil and its water-holding capacity decreased.

C.W.S.H.

2993. CHILD, R., AND NATHANAL, W. R. N.

Changes in the sugar composition of coconut water during maturation and germination.

J. Sci. Food Agric., 1950, 1: 326-9, bibl. 13.

Changes in the sugar content of the water of the coconut have been followed during ripening and germination. From the most immature fruit in which the cavity has just formed to about the 7-month-old fruit when it is full size but still unripe, the sugars present, which are almost entirely reducing sugars, increase to a maximum of about 5% concentration. Thereafter non-reducing sugars appear, but the total concentrations of sugars falls to about 2% in the fully ripe nut, 12 to 13 months old. The results were much the same in the three varieties of *Cocos nucifera* L. studied—the ordinary tall palm, a dwarf variety, and a variety with orange-coloured fruit, known in Sinhalese as Rath-Thembili—except that in the water of dwarf nuts small amounts of non-reducing sugars were present in the earlier stages. During the early stages of germination the concentration of reducing sugars continues to fall, but that of total sugars remains fairly constant until the fourth month of germination, when it also falls. [Authors' synopsis.]—Coconut Res. Scheme, Ceylon.

2994. SADASIVAN, V.

The phosphatases in coconut (*Cocos nucifera*).

Arch. Biochem., 1951, 30: 159-64, bibl. 17.

1. The distribution of enzymes in the various parts of coconut and the properties of phosphatases in the kernel have been investigated. It was observed that while the germ or embryo contains all the enzymes, the endosperm (kernel and milk) contains only phosphatases, dehydrogenases, peroxidase, and catalase. 2. The phosphatases in the kernel have an optimum pH on the acid side and hydrolyse a variety of phosphoric acid esters. Phosphatase activity of the kernel is inhibited by fluoride but, not by iodoacetate or cyanide. Magnesium and manganese do not activate it. The importance of the enzyme to the growing embryo is discussed. [Author's summary.]—Nutrition Res. Lab., Coonoor.

2995. REINKING, O. A.

Preliminary report on the cadang-cadang disease and on soil deficiency troubles of coconuts in the Philippines.

Plant Dis. Repr., 1950, 34: 300-4, bibl. 6.

The symptoms of the cadang-cadang disease, which is suspected to be a virus disease, are a general yellow-bronzing, especially on the older lower leaves. The symptoms of a soil deficiency trouble are a general yellowing of the older living leaves and an abnormal number of browned dead leaves hanging from the top of the tree around the trunk. Measures suggested for investigating these diseases are outlined.

2996. VAN DER VECHT, J.

The coconut leaf moth (*Artona catoxantha* Hamp.). Part I. Life history and habits of *Artona catoxantha*, its parasites and hyperparasites.

Contr. gen. agric. Res. Stat. Bogor 110, 1950, pp. 77, bibl. 59, illus.

This comprehensive review of our present knowledge of the biology of this pest and its parasites includes the results of the author's own investigations. It is to be followed by papers dealing with the ecological and practical aspects of the problem.

Coffee.

(See also 2202, 2889, 2972, 2975, 3085, 3088a, d, e, f, 3110, 3113, 3136, 3137.)

2997. COWGILL, W. H.

Greatly increased coffee production possible through scientific methods.

Tea and Coffee Trade J., January 1951, reprinted in *Mon. Bull. Coffee Bd Kenya*, 1951, 16: 88-9.

The work of Central and South American Coffee Research Stations in breeding superior strains and improving cultural methods is reviewed.

2998. MACHADO S., A.

La selección individual o genealógica en el *Coffea arabica* L. var. *typica* o nacional. (Individual or genealogical selection in *Coffea arabica* var. *typica* o nacional.)

Bol. inf. Colombia, 1950, No. 7, pp. 27-32.

Although a certain amount of cross pollination may

occur in typica coffee, the author considers that it may be classed as an autogamous plant and that improvement may be carried out on the basis of individual selection. Preliminary studies carried out by the National Centre for Coffee Investigations, Colombia, have shown that the population of typica coffee is very heterogeneous and consists of a number of distinct lines of unequal productive capacity.

2999. CASTRO A., M. F.

Resultados obtenidos en el análisis estadístico de los rendimientos de cafetos para la selección de los mejores árboles. (Results of a statistical analysis of yields of coffee trees, made with a view to the selection of the best trees.)

Bol. inf. Colombia, 1949, No. 1, pp. 20-2 [received 1951.]

The results of trials indicate that, from a plot of 900 coffee trees, a sample of at least 150 trees must be taken to give a true representation of the average annual yield. In order to determine the "real" average yield of a variety, yields must be recorded for a period of at least 4 seasons. This period is considered to be the productive cycle of the trees. Free-growing trees showed a greater variability than pruned trees.

3000. CASTRO A., M. F.

Resultados obtenidos en el análisis estadístico de los rendimientos para la selección de las mejores plantas. (Results of a statistical analysis of yields [of coffee trees] made with a view to the selection of the best trees.)

Bol. inf. Colombia, 1950, No. 12, pp. 28-36, bibl. 15.

The yields and variation in cropping were studied of individual coffee trees grown in a selection plot at the National Centre for Coffee Investigations, Colombia.

3001. SUÁREZ DE CASTRO, F.

Algunas observaciones sobre el sistema radicular del *Coffea arabica* L. (Observations on the root system of *Coffea arabica*.)

Bol. inf. Colombia, 1950, No. 8, pp. 34-8.

A report of a lecture, not including graphs, tables or bibliography, on the work that is being done at the National Centre for Coffee Investigations, Colombia, on the distribution of coffee roots. A review of the literature and of the methods of study used by other workers is followed by a detailed description of the method used in the present investigations [see abstract 3003]. The following observations have been made. The absorbing roots are mainly in the surface layer; this is probably due to the better aeration and higher N content of the top soil. The gradient of the land has no effect on the distribution of the roots. The root systems were better developed in a soil of pH 7.0-7.3 with a high base exchange capacity than in a soil of pH 5.25 with a low exchange capacity. Soil drainage had a marked effect on root distribution. The concentration of roots decreased progressively from the trunk towards the periphery. There was no clear correlation between root development and any morphological character of the tree. The application of these findings to cultural practices, such as fertilizing and the construction of terraces and ditches, is discussed.

3002. HENAO, J. J., AND GORBEA, O.

Las lluvias y la producción del cafeto. (Rain and coffee production.)

Agron. Caracas, 1948, 3: 3/6: 25-33, from abstr. in *Bol. inf. Colombia*, 1949, No. 2, p. 8 [received 1951].

A study of the rain requirements of coffee trees, carried out in various districts of Venezuela, led to the following general conclusions. (1) Little or no rain during the months preceding flowering has a beneficial effect on the crop. (2) During flowering, ideal [unspecified] quantities of well-distributed rain are required. (3) Between the flowering periods, heavy or excessive rains are not desirable. (4) Severe drought immediately following flowering is even more detrimental than excessive rain. (5) Except in extreme cases the total amount of rain does not appear to affect the yield.

3003. ANON.

Conservación de suelos. (Soil conservation.)

Bol. inf. Colombia, 1950, No. 4, pp. 13-14.

The method used by the National Centre for Coffee Investigations, Colombia, for studying the distribution of roots of coffee trees is described. The method has been used successfully in Brazil. A block of soil, 30 cm. wide (15 cm. on either side of the tree), of a length equal to the distance between the trees, and of a depth slightly more than that of the deepest roots, is selected as a sample. This is excavated in smaller blocks of 30 cm. square and 10 cm. deep, which are numbered. The roots found in each block are washed and dried. The coffee roots, after separation from those of other plants, are then divided into 5 groups according to diameter, and the dry weight of each group is determined. In this way the weight, total length and distribution of the roots may be determined.

3004. SUÁREZ DE CASTRO, F.

Resumen de los resultados obtenidos en algunas investigaciones sobre conservación de suelos y agua, durante el año de 1949. (A summary of results of some investigations on the conservation of soil and water carried out during 1949.)

From abstr. in *Bol. inf. Colombia*, 1950, No. 12, p. 5.

The primary aims of these investigations were to determine the quantities of soil and water lost through erosion in the coffee zone of Colombia and to develop soil conservation practices. Observations on the effects of such factors as gradient, soil cover, systems of culture and terracing are recorded, and rainfall data for the region are related to erosion losses.

3005. SUÁREZ DE CASTRO, F., AND BETANCOURT, H.

Canales de desviación y acequias de ladera. Recomendaciones para los supervisores seccionales. (Deviation canals and ditches [for soil conservation]. Recommendations for regional supervisors.)

From abstr. in *Bol. inf. Colombia*, 1950, No. 12, p. 6.

Directions are given for the layout, construction and maintenance of soil conservation canals and ditches, and tables are provided for calculating the correct spacing of ditches in (a) pure stands of crops and (b) pastures, coffee plantations or woods.

3006. VILLANOVA, T.

Uso y efectos del "mulch" en las plantaciones de café. (The use and effects of mulch in coffee plantations.)

El Café de El Salvador, 1949, 19: 220: 1713-19, bibl. 7, from abstr. in *Bol. inf. Colombia*, 1950, No. 3, pp. 6-7.

The author presents the results of various experiments to determine the effect of mulching on erosion, soil temperature and moisture, yields and the amount of labour required for weeding. In an experiment carried out at the Centro Nacional de Agronomía, El Salvador, with mulches of leguminous material, or other forms of organic matter treated with nitrogen, the following results were obtained: On the mulched plots the leaves were a darker green and there was less leaf-fall at the end of the dry season; more feeding roots developed, and the soil had a better structure and moisture retaining capacity; flowering was more uniform; vegetative growth was increased 46% during the dry season and 10% during the rainy season; yield was increased by more than 100%. Some of the problems of mulching and ways of overcoming them are discussed.

3007. RODRÍGUEZ, A.

Abone con pulpa de café. (Mulching with coffee pulp.)

Bol. Ext. Fed. nac. Cafeteros 3, 1950, pp. 4, illus.

Decomposed coffee pulp contains 1.7% N, 0.05% P and 1.06% K. Its application to coffee plantations is urged, both as a soil amendment and to prevent erosion. It is most valuable when composted with other forms of humus or fertilizers, and detailed instructions and diagrams are given for the construction of a composting pit.

3008. ALARCON, P. J.

Instrucciones sobre el manejo de fosas y silos para pulpa de café. (Making silage and compost from coffee pulp.)

Arch. Sec. Quím. anal. Cenifacé, 1949, from abstr. in *Bol. inf. Colombia*, 1950, No. 12, pp. 11-12.

Simple methods of making coffee pulp silage for fodder and of composting the pulp with farmyard manure in pits are described.

3009. MACHADO S., A.

Influencia del sombrero, el suelo y las prácticas de cultivo en el desarrollo del café en sus primeros meses de vida propia. (The effect of shade, soil and cultural practices on the early development of the coffee tree.)

Bol. téc. Colombia, 1946, 1: 1: 1-32, from abstr. in *Bol. inf. Colombia*, 1950, No. 12, pp. 14-15.

The results obtained from an experiment comparing the effects of 3 densities of shade, 2 types of soil and 2 cultivation practices on the development of coffee trees in the nursery include the following:—Of the 3 factors studied, shade had the greatest effect. The optimum density was 40%, but dense shade was more detrimental than full exposure. Shade had most effect on size of leaves, total number of roots and number of

absorbing roots. Second in importance was the soil factor. More absorbing roots were formed in alluvial soil than in volcanic ash. In no case were monthly cultivations justified and in some cases they were detrimental.

3010. GERLACH DE URHAN, M.

El papel de las substancias tóxicas en la interacción de las plantas superiores. (The role of toxic substances in the interaction of higher plants.)

Bol. inf. Colombia, 1950, No. 8, pp. 25-9.

After reviewing experiments made by other workers to determine the causes of the inhibiting effect that certain plants (e.g. guayule and *Encelia farinosa*) have on the growth of neighbouring plants of the same or different species, the author describes her own experiments on the effect of old coffee trees on the growth of young *Inga* shade trees. It has been reported that growth of *Inga* trees is retarded in old coffee plantations. In pot experiments, development of *Inga* seedlings grown round a coffee tree was retarded compared with that of seedlings grown alone, and it was proved that this was not due to differences of nutrition, differences of light or lack of nodule formation. In water-culture experiments, *Inga* seedlings watered with aqueous extracts of coffee roots were smaller than those watered with distilled water and the development of new roots was inhibited. Seedlings grown in sand containing coffee roots developed swellings on their root-tips. It is concluded that coffee roots contain a substance that inhibits the growth of *Inga* plants in the laboratory. Whether inhibition occurs in the field may depend on whether the seedlings are sown *in situ* or transplanted. The nature of the inhibiting substance is being studied.

3011. ALARCON, P. J., AND PARRA, J.

Estudio del café en su aspecto natural e industrial. (A biochemical study of coffee.)

Arch. Sec. Quím. anal. Cenifacé, 1948, from abstr. in *Bol. inf. Colombia*, 1950, No. 12, p. 10.

A study was made of the chemical and physical constants of the ripe, dry fruit of *Coffea arabica* and of its component parts, such as the pulp, mucilage, husk and kernel.

3012. MOORES, R. G., AND GRENINGER, D. M.

Determination of trigonelline in coffee.

Analyt. Chem., 1951, 23: 327-31, bibl. 25.

Trigonelline represents about 5% of the soluble solids in coffee beverage. It contributes to coffee flavour and aroma, and may have important physiological properties. An easy and reliable method for determining trigonelline was needed in the study of coffee composition and flavour development. The method [which is described] will be useful in further studies on the composition and processing of coffee. [From authors' summary.]

3013. ANON.

Noticias del Centro. (Notes from the National Centre for Coffee Investigations, Colombia.)

Bol. inf. Colombia, 1950, No. 5, pp. 31-3.

Preliminary results are given of (1) a trial to determine the effects on yield of 7 methods of pruning coffee, and (2) a trial of seedling and clonal selections of coffee.

3014. URHAN, O.

Algunas ideas sobre el problema de la crespura. (Some ideas on the problem of "crespura" [a disorder of coffee trees].)

Bol. inf. Colombia, 1950, No. 9, pp. 28-35.

"Crespura", a disorder of unknown origin, is becoming a serious problem in coffee plantations in Colombia. The leaves of affected trees are small and comparatively long, internodes are short and lateral shoots develop freely, so that the branches have a "witches' broom" appearance. Most of the fruit on affected branches is small or deformed, and the young leaves are slightly mottled. The disorder does not appear uniformly throughout all parts of the tree, some branches showing symptoms while others appear healthy. In some cases individual trees in a plantation are affected and in other symptoms appear on groups of 3 or 4 trees together. The possible causes of the disorder are discussed in some detail, virus and fungus infection, insect attack, nutritional disturbance and bud mutation being considered in turn. North American workers on the problem tend to favour the nutritional theory. No fungus has been found in affected tissues. The investigations that are being carried out at the National Centre for Coffee Investigations, consisting initially of grafting experiments, are outlined. Although no results have yet been obtained, the interesting observation has been made that seeds from affected branches germinate much more quickly than those from healthy branches. This suggests a hormonal disturbance, which may be related to zinc deficiency.

3015. PONTIS, R. E.

A canker disease of the coffee tree in Colombia and Venezuela.

Phytopathology, 1951, 41: 178-84, bibl. 15, illus.

A canker disease of the coffee tree in Colombia and Venezuela, known locally as "llaga macana", causes widespread economic loss in production. It is believed to be the same disease as "kanker" reported on coffee trees in Java. Cankers usually occur around pruning wounds and injuries on older wood, and they may girdle the affected parts. The disease is attributed to *Ceratostomella fimbriata*, but attempts to induce cankers in the coffee tree with the strain of *C. fimbriata* from sweet potato failed.—Inst. Nac. Agric., Maracay, Venezuela.

3016. WELLMAN, F. L.

Tree defoliation for control of *Omphalia* disease of coffee.

From abstr. in *Phytopathology*, 1951, 41: 38.

Defoliating coffee trees severely attacked by *Omphalia flavidula* was tested at Turrialba, Costa Rica, as a control measure. Removed foliage was left on the ground. New healthy leaves developed in 6 weeks and remained healthy, accompanied by renewed tree vigour. In treated plots fruits and flowers increased up to more than 1,000% over those on untreated diseased trees.

3017. J., J., AND A., C.

Nemátodos prosperando en colonias de un hongo del género *Penicillium*. (Nematodes thriving in colonies of *Penicillium*.)

Bol. inf. Colombia, 1950, No. 9, pp. 38-9, illus.

In the course of a study carried out at the National Centre for Coffee Investigations, Colombia, to determine the cause of a certain pathological disorder of coffee trees, an [unnamed] species of nematode was observed on the artificial culture of a *Penicillium* fungus extracted from the coffee roots. The relationship of the nematode to the fungus and to the coffee trees is being investigated.

3018. CASTAÑO, J. J.

Contribución al estudio del cardenillo del café pergamino. (A contribution to the study of moulds on coffee beans.)

Bol. inf. Colombia, 1949, No. 1, pp. 17-20 [received 1951].

In districts where comparatively low temperatures and high humidity occur during the harvest period, it is important that coffee should be dried as rapidly as possible after it has been washed, to prevent the development of moulds. These moulds are caused mainly by *Penicillium* and *Aspergillus* spp. A series of experiments was carried out to determine the most effective method of drying. If the beans are to be used for seed, development of the fungi can be prevented by dipping them in a bath of mercury bichloride solution (1:1,000); they will dry satisfactorily in 72 hrs. if spread in very thin heaps in an airy place. Coffee for consumption will dry in 10 hrs. if spread in layers less than 5 cm. thick and subjected to a temperature of 37° C., in 2 hrs. at a temperature of 80° C., and in 1 hr. at 120° C. Care must be taken not to raise the temperature above 120° C. or the coffee will have the appearance of having been pre-roasted. Dried beans must be kept in a dry, well ventilated place to prevent subsequent infection.

3019. TRIANA, J. V.

Anotaciones preliminares al estudio de una modalidad mas, en el control del "cardenillo", mediante el uso del agua. (Preliminary notes for the study of another method of preventing the development of moulds on coffee by means of water.)

Bol. inf. Colombia, 1950, No. 4, pp. 19-22.

In Colombia the coffee harvests coincide with the rainy seasons, and there is rarely enough sunshine to dry the beans after washing and fermentation before moulds develop. Experiments were carried out at the National Centre for Coffee Investigations to determine the effects of the Venezuelan practice of storing the beans in water for a month or more after washing until they can be dried in the sun. The external appearance and chemical composition of beans stored under continuously running water for 8, 16, 24 or 32 days were not affected; moulds did not develop, nor was there any odour of decomposition; the effect on the quality of the coffee remains to be determined. When the beans were stored under still water which was changed 3 times a day, moulds were found to develop and a certain amount of decomposition occurred which was detrimental to the appearance and quality of the coffee.

3020. RAYNER, R. W.

A note on onion flavour.

Mon. Bull. Coffee Bd Kenya, 1951, 16: 60.

The results of a further season's examination have shown no connexion between the occurrence of onion

flavour and the use of insecticides and fungicides. The earlier view [see H.A., 20: 3232] indicating contact with water as the cause is supported, and it is advised that with the early part of the crop any practices which lead to the coffee being wet should be reduced to a minimum.

3021. RAYNER, R. W.

Bricky flavour.

Mon. Bull. Coffee Bd Kenya, 1951, 16: 90-1.

All cases of "bricky" flavour, which have recently increased in Kenya, have been traced to plantations on which BHC had been used in some form. Experiments have been started to find satisfactory methods of applying the chemical.

Hard fibres.

(See also 3088m.)

3022. JOYNER, J. F., GANGSTAD, E. O., AND

SEALE, C. C.

The vegetative propagation of *Sansevieria*.

Agron. J., 1951, 43: 128-30, bibl. 4, illus.

In trials at the Everglades Experiment Station, Florida, with *Sansevieria guineensis* and other species of *Sansevieria*, leaf cuttings taken in August-September or February-March showed the highest percentage of survival. The best rooting occurred following treatment for 1 hr. with 50 p.p.m. of indoleacetic acid before planting. The most rapid and prolific growth was obtained with cuttings from the tip section of the leaves.

3023. ALVAREZ GARCÍA, L. A., AND DÍAZ, M. A.

***Aspergillus* root-stalk rot of *sansevieria* (*Sansevieria laurentii*, Wildem).**

J. Agric. Univ. Puerto Rico, 1949 (issued November 1950), 33: 45-53, bibl. 13.

Dusting cuttings with Spergon (tetrachloro-benzoquinone) and Semesan Jr. (ethyl-mercury-phosphate 1%) or dipping in mercuric bichloride followed by thorough washing gave effective control of *Aspergillus niger* on *Sansevieria laurentii*, a bud sport of *S. zeylanica*.

3024. ALVIM, P. DE T.

Deficiências minerais em sisal e a "necrose de base das folhas". (Mineral deficiencies in sisal and leaf base necrosis.) [English summary ½ p.]

Rev. Ceres, 1950, 8: 222-32, bibl. 4, illus.

From cultures in nutrient solutions of different composition the author concludes that leaf base necrosis of sisal (*Agave sisalana*) is caused by manganese deficiency and not by potassium shortage. All the symptoms of the disorder as seen in the field have been observed in plants grown in solutions where manganese was not available.

Mangoes.

(See also 3110.)

3025. RUEHLE, G. D.

Fertilizer practices for the mango.

Reprinted from *Proc. Fla Mango Forum*, 1949, pp. 6, bibl. 10.

At the Florida Sub-Tropical Experiment Station small dressings of complete fertilizer every 3 to 4 weeks have

given good results with seedling rootstocks and young grafted trees in the nursery. For young, non-bearing trees an NPK Mg mixture can be applied monthly in the first year and once every 2 months in the second and third years. This should be accompanied by regular spraying with copper to control leaf diseases, and zinc sulphate should be added to the copper 2 or 3 times a year; on alkaline soils manganese sulphate should be supplied. Suggestions for bearing trees are based on the results of preliminary trials. They involve withholding fertilizer in the autumn when flower-bud differentiation normally occurs, applying quick-acting N, or N and K, when the flower panicles first appear, followed 3 to 4 weeks later and again during the summer by complete NPK Mg mixtures. Cu, Zn and Mn can be supplied in the spray programme for the control of anthracnose. The literature on irregular bearing in mangoes is discussed.

Oil palms.

(See also 2974.)

3026. CARRIÈRE DE BELGARRIC, R.

Notes sur la sélection du palmier à huile à Sumatra. (Notes on the selection of oil palms in Sumatra.)

Oléagineux, 1951, 6: 65-71, illus.

A study is reported, with tabulated results of yields, of selections and hybrids of the oil palm, *Elaeis guineensis* varieties *dura* and *tenera*, in Sumatra plantations. Whereas yields of oil per hectare of first generation trees ranged from 2,000 to 3,800 kg., that of second generation palms was about 5,000 kg.

3027. MICHAUX, P.

Principes généraux de conduite des pépinières d'*Elaeis*. (General principles for operating oil-palm nurseries.)

Oléagineux, 1951, 6: 253-5, illus.

The oil palm, *Elaeis* [*guineensis*] requires specially careful treatment, particularly in the early years, and here notes are given on preparing the seed for sowing, the optimum conditions for germinating them (temperatures 35°-40° C., humidity 99%), transplanting, spacing, soil sterilization (partial incineration), shade and watering, control of diseases and pests, manuring and chemical fertilizers, and fallowing.

3028. JULIA, H.

Premiers résultats de la mécanisation des travaux de défrichement sur forêt dense. (Preliminary results of the mechanization of work in forest clearing.)

Oléagineux, 1951, 6: 137-41, illus.

Labour problems and costs in forest clearing and in the maintenance of oil-palm plantations under mechanized and non-mechanized conditions are discussed in the light of experience at Sibiti. Results suggest that mechanization can effect a saving of 60% in labour in clearing operations and of 30% on subsequent maintenance.

3029. FRASELLE, J. V.

Experimental evidence of the pathogenicity of *Fusarium oxysporum* Schl. f. to the oil palm (*Elaeis guineensis* J.).

Nature, 1951, 167: 447, bibl. 3.

The washed roots of vigorous oil palm seedlings were dipped in a solution culture of *Fusarium oxysporum*, after which the seedlings were planted in sterile soil. About 40 days after inoculation some leaf yellowing, desiccation and browning could be observed, while the controls were dark green and healthy. After 2 months many of the treated seedlings were seriously affected and some were dead. Pure cultures of the fungus were isolated from necrotic "bulb" tissue, whereas the control seedlings—all of them healthy—did not yield any *Fusarium* isolates. These and other findings indicate that *Fusarium oxysporum* is pathogenic to the oil palm, causing rotting of roots and a necrosis of the wood-vessels in the shoot; and that the method of inoculation described above may afford a means of investigating the reaction of seedling palms to this pathogen.—Inst. National pour l'Étude Agronomique du Congo Belge, Yangambi.

3030. BOWES, P. C., AND OTHERS.

Spontaneous heating and ignition in stored palm kernels. I. A survey of occurrences of heating and fire.

BURGOYNE, J. H., AND THOMAS, A.

Idem. II. Reactions between palm-kernel bag fat and gaseous oxygen.

BURGOYNE, J. H., AND THOMAS, A.

Idem. III. Steady-state temperature distribution in a uniform mass of material subject to atmospheric oxidation: a uni-dimensional treatment.

BOWES, P. C., AND THOMAS, A.

Idem. IV. Observations of temperature, humidity, and air composition in palm-kernel stacks.

BOWES, P. C.

Idem. V. A study of the self-heating of the palm kernels and the jute bags in the presence of moisture.

BURGOYNE, J. H.

Idem. VI. Summary and conclusions.

J. Sci. Food Agric., 1950, 1: 360-6, illus.; 1951, 2: 8-20, bibl. 5, 20-30, bibl. 1, 65-79, bibl. 14, illus., 79-91, bibl. 29, 157-60, bibl. 5.

A series of fires in stored palm kernels in 1944 led to a comprehensive survey of 57 occurrences of heating and fires by the Fire Research Division of the Ministry of Home Security and subsequent investigations by the Department of Scientific and Industrial Research of the U.K. It is considered that the heating was mainly due to the respiration of microflora developing in the material. Recommendations to minimize fire risk are made.

3031. MELLIER, M.-T.

Les stérols de l'huile de palme. (The sterols of palm oil.)

Oléagineux, 1951, 6: 20-4, bibl. 12.

From their physical constants and a spectrophotometrical study the author concludes that the insaponifiable sterols of palm oil essentially consist of sitosterol with a little ergosterol.

Pineapples.

(See also 3110.)

3032. MACHADO S., A.

Cultivo de la piña. (Pineapple culture.)

Bol. téc. Colombia, 1949, 1: 4: 1-21, from abstr. in *Bol. inf. Colombia*, 1950, No. 12, pp. 15-16.

Fertilizer experiments with pineapples are reported, in which it was found that 2 applications of 16 g. complete fertilizer per plant, given 6 and 9 months after planting, gave the same results as 3 applications given 3, 6 and 9 months after planting. No significant differences were observed between single row and double row crops.

3033. PENNOCK, W.

Field response of red-spanish pineapples to nitrogen, calcium, iron and soil pH.

J. Agric. Univ. Puerto Rico, 1949 (issued November 1950), 33: 1-26, bibl. 3.

In replicated trials at two centres in Puerto Rico, ammonium sulphate proved to be superior to ammonium nitrate as a source of nitrogen for pineapples. Repeated spraying with ferrous sulphate and the application of calcium carbonate gave highly significant yield increases at one centre but not at the other. The yield was depressed slightly at one centre and significantly at the other by rock phosphate where lime had also been applied. The explanation of these results in terms of the alteration of soil pH is discussed.

3034. NAVELLIER, E.

La maturité des ananas et le réfractomètre à main. (The ripeness of pineapples and the hand refractometer.)

Fruits d'Outre Mer, 1950, 5: 412-16, illus.

Three types of hand refractometers for examining pineapple juice, to determine the degree of ripeness of the fruit, are described and illustrated, and the method of using them is explained.

3035. MILLER, E. V.

Physiological studies of the fruits of the pineapple [*Ananas comosus* (L.) Merr.] with special reference to physiological breakdown.

Plant Physiol., 1951, 26: 66-75, bibl. 8.

The chemistry and physiology of 5 varieties of pineapple were studied to determine whether there were any varietal characteristics that might be associated with susceptibility to physiological breakdown. This work was subsequently expanded to include observations on physiological and chemical changes produced by subjecting fruits to storage at low temperatures. Although there was considerable variation in the soluble solids, pH and total acids of the juice of the different varieties, no specific differences were found except in the case of Natal, the juice of which was unusually high in solids. Ascorbic acid, however, was higher in the Abachi and Queen varieties than in Red Spanish, Natal and Cayenne. Red Spanish pineapples showed higher peroxidase activity than any of the other varieties. The only significant differences between the constituents of normal fruits and those showing physiological breakdown was the very low percentage of ascorbic acid in the latter. Subjecting fruits to a temperature of 5° C. for 48 hours resulted in a significant lowering of pH.—Univ. Pittsburgh, Pennsylvania.

3036. ANDERSON, E. J.

The *Phytophthora cinnamomi* problem in pineapple fields of Hawaii.From abstr. in *Phytopathology*, 1951, 41: 1-2.

Phytophthora cinnamomi is present in much of those pineapple lands of Hawaii where annual rainfall exceeds 50 to 60 inches. It can completely destroy plantings or seriously reduce yields. Roots, growing points of stems, and green fruit may be attacked, but destruction of the roots accounts for the greatest damage.

3037. ANDERSON, E. J.

Effect of nutrient salt concentration on infection of pineapple roots by *Phytophthora cinnamomi*.From abstr. in *Phytopathology*, 1951, 41: 2.

Experiments were carried out with tap-water cultures. Infected roots rotted at about the same rate and root growth in non-infested cultures was about equal, regardless of solution concentration. Fertilization of pot cultures in accordance with solution culture results delayed or prevented severe root rot. Leaching of soils in high rainfall areas precludes control by means of heavy fertilization in the field.

3038. ANON.

La gomosis de la piña. (Gummosis of pineapples.)Hacienda, 1950, 45: 40, from abstr. in *Bol. inf. Colombia*, 1950, No. 11, p. 13.

Laboratory studies in Puerto Rico have shown that gummosis of pineapples is associated with attacks of *Batrachedra mathesoni* Busck. Various insecticides have been tested for control of the larvae of this moth, and the best results were obtained with an emulsion of 74% chlordane 1: 400 applied at a rate of 640 l. per ha. The most effective number of applications has not yet been determined, but preliminary trials suggest that 5 applications are sufficient, 1 before flowering, another 50 days later and the rest following at intervals of 15 days.

Rubber and other laticiferous trees.

(See also 3088k, o.)

3039. SCHWEIZER, J.

Aanbevelen heveaplantmateriaal 1949-1950. (Recommended hevea planting material, 1949-50.)*Bergcultures*, 1950, 19: 9-11.

Notes are supplied on clones, seedlings and rootstocks recommended by the C.P.V. Research Station, Buitenzorg.

3040. MEYER, W. H.

Heveaselectie op de kweekbedden door middel van de perforatie-methode. (Hevea selection in the nursery by means of the perforation method.)*Bergcultures*, 1950, 19: 71-9, illus.

Working on the theory that hevea trees which have a high production of latex in their youth will continue to yield well throughout their life, P. J. S. Cramer developed a method of detecting high-yielding seedlings by tapping in the nursery [see *H.A.*, 4: 644]. The author

here discusses the shortcomings of this method and describes a new and improved technique for tapping nursery trees. Instead of the special Testatex knife with 4 V-shaped blades, a small perforating wheel is used, which, it is claimed, is easier to handle and gives a more uniform cut. To ensure accurate results such factors as time of tapping, height of cut and viscosity of latex must also be taken into consideration.

3041. PICHEL, R. J.

Premiers résultats en matière de sélection précoce chez l'hévéa. (First results obtained in the early selection of hevea.)*Publ. Sér. tech. I.N.E.A.C.* 39, 1951, pp. 43, illus., 40 f.

The preliminary results of two trials carried out with seedling heveas at Yangambi are described. The data obtained on vigour and yield of latex are tabulated and discussed. The seedlings were subjected to the Cramer "Testatex" test by means of a special knife which makes V-shaped incisions in the cortex. According to the type of latex flow, 5 categories were distinguished; the seedlings in classes 4 and 5 were productively superior to those of the lower classes. The selected seedlings form the "mother" plants of clones. The advantages and disadvantages of clonal material and of seedlings for the establishment of plantations are discussed.

3042. GREVEN, C., AND VOLLEMA, J. S.

Resultaten van geselecteerde zaailingen in vergelijking met aanbevolen clonen in de rubbercultuur. (A comparison between yields of selected hevea seedlings and those of recommended clones.) [English summary ½ p.]*Bergcultures*, 1950, 19: 159-63.

In trials at the Tjiomas Experimental Station, Indonesia, it was found that the average yield of unthinned seedlings obtained from hand-pollinated crossings of selected parents was lower, at least after the tenth year of their life, than that of good clones. This result was confirmed by a comparison of the yields of the seedling family Tjir 1, BD 5, and those of the budded parent clones Tjir 1 and BD 5. As, however, seedlings have a greater variability of yield and are less affected by local conditions, it is considered that the productivity of selectively thinned, good seedling families could be about equal to that of good budded clones. This supposition has been confirmed by observations made on a commercial estate. The choice of planting material, therefore, must depend on local conditions.

3043. VOLLEMA, J. S.

Resultaten van enige proeven over de grootte van plantgaten in de rubbercultuur. (Results of experiments on the size of planting holes for rubber trees.) [English summary ½ p.]*Bergcultures*, 1950, 19: 49-57, bibl. 5.

The effect of the size of the planting hole on the performance of rubber trees was determined on a number of different soil types. The results suggest that on permeable, deep soils planting holes of 1 m² are unnecessary, equally good results being obtained with holes 0.42 m² (0.75 × 0.75 × 0.75 m.). Trees

planted in such holes came into tapping a year earlier than trees in holes 0.125 m^3 ($0.5 \times 0.5 \times 0.5 \text{ m.}$), and only half the number of replacements was required. On exceptionally good soils it was found that even smaller holes would suffice (0.038 m^3). On less permeable clay soil, however, small holes (0.25 m^3) retarded the development of the trees considerably. Practical experience has shown that on shallow soil it pays to make holes 1 m^3 and to enlarge them after a few years by digging deep trenches near the original holes. On heavy clay soil it has proved advisable to fill the planting hole with fertile soil mixed with organic material.—C.P.V. Research Station, Bogor.

3044. MORALES, J. O., BANGHAM, W. N., AND BARRUS, M. F.

Cultivos intercalados en plantaciones de hevea. (Intercrops in hevea plantations.) *Bol. t c. Inst. interamer. Cien. agric. Turrialba* 1, 1949, from abstr. in *Bol. inf. Colombia*, 1950, No. 7, p. 12.

The value of various crops for planting as intercrops in young hevea plantations was studied in areas with a temperature of $23\text{--}26^\circ \text{C.}$ and an annual rainfall of 254 cm. *Yucca* proved to be a profitable crop but maize required too much labour. The cultivation of intercrops resulted in a better growth of the hevea, and fewer replacements of trees.

3045. ANON.

On manuring and related problems in rubber.

Adv. Circ. Rubb. Res. Scheme Ceylon 29, 1950, pp. 8.

The maintenance and improvement of soil fertility and the manuring of mature rubber, young rubber and young rubber in tapping are discussed in general terms. It is suggested that the state of the cover crops and of the canopy should be used as indicators of soil conditions and the state of the tree respectively. With young rubber, girth increase, which should be at least 3 in. per annum, is an excellent indicator. In conclusion it is pointed out that standard fertilizer programmes have not always produced the desired results in Ceylon, and that there is a need to study the effects of magnesium and of the minor elements.

3046. VOLLEMA, J. S.

Brand in rubbertuinen. (The effect of fire in the rubber plantation.)

Bergcultures, 1950, 19: 105.

The damage caused by fire in a rubber plantation depends on the extent to which the bast is burnt. If it is only superficially blackened, it will heal rapidly by increased cork formation. If the damage is deeper but has not penetrated to the cambium, the injured parts will also heal in time and the dead bast flake off. Where the trees are completely ringed down to the cambium, recovery is doubtful. Trees react to burning by producing an increased flow of watery latex, but it is considered unlikely that rubber production is increased. Where the burns have penetrated to the cambium the dead bast should be scraped away, the edges of the wounds smeared with a wound dressing (TB 192), and the wood covered with 9 parts "Wono-kromo asphalt 20-30" to 1 part "Carbolineum plantarium"; or with coal tar.

3047. PF LTZER, A.

Advies inzake bestrijding van witte wortel-schimmelaantasting (*Fomes lignosus*, syn. *Rigidoporus microporus*) in hevea-aanplantingen. (Advice on the control of the white root fungus in hevea plantations.)

Bergcultures, 1950, 19: 219-29.

In mature plantations where the roots form a closed network, infection by *Fomes lignosus* spreads easily from one tree to the next. When the extent of infection has been ascertained, the diseased patch must be isolated from the rest of the plantation either by digging a trench round the infected trees or by exposing the collar of the roots on 2 rows of healthy trees surrounding the patch. The second method is preferred. Treatment within the isolation ring depends on the degree of infection, badly diseased trees being grubbed and slightly diseased ones having the collar of the roots exposed. Advice is given on cleaning the ground and replanting. In young plantations, where there is no closed network of roots, it may also be wise to dig up infected trees and replant after the ground has been thoroughly cleared of all pieces of root or wood. When this is not desirable, however, the roots may be exposed as far as possible, infected portions cut away and the rest disinfected with 2% copper sulphate or a carbolineum solution; the soil should then be replaced. Indicator plants such as *Tephrosia* or *Crotalaria* may be used to detect sources of primary infection. Although it is advisable to plant only healthy material, slightly infected plants may be used if the diseased roots are cut away and the rest disinfected.

3048. PHILLIS, E., AND OTHERS.

Better natural rubber.

Special Issue Quart. Circ. Rubb. Res.

Scheme Ceylon, September, 1950, pp. 27.

This special issue is devoted entirely to the campaign for better natural rubber and contains the following reprints from other journals: Phillis, E., "The future of the natural rubber industry in Ceylon" [noted in *H.A.*, 21: 2111p]; Anon., "Specified rubbers" [see *H.A.*, 20: 2040]; Malayan Conference September 1949, "Improvement in the quality of natural rubber" [see *H.A.*, 20: 3264]; and extracts from an article by Dr. J. Schweizer on steps toward uniform natural rubber in *Arch. Rubbercult.*, 1949.

3049. VERHAAR, G.

De bereiding van No. 1 ribbed smoked sheet-plus met pepton 22-D. (The preparation of No. 1 ribbed smoked sheet-plus with Pepton 22-D.)

Bergcultures, 1950, 19: 91.

The use of Pepton 22-D ($0,0'$ -dibenzamido-diphenyl disulphide) as a "peptizer" in the preparation of sheet rubber is described.

3050. DE HAAN-HOMANS, L. N. S.

Esterase in latex of *Hevea brasiliensis*.

Industr. engng Chem., 1951, 43: 403-6, bibl. 9.

No lipase was found in hevea latex but it was shown to contain an esterase which decomposes low esters, particularly ethyl acetate, rapidly and to a high degree. Experiments carried out at the Indonesian Rubber Research Institute also showed that the pH of latex,

about 7 on exudation from the tree, decreases rapidly immediately after exudation and soon reaches 6.2 to 6.5. The esterase may be involved in this process.

Sugar cane.

(See also 3088b, i, 3103, 3112, 3120-2, 3133.)

3051. VALLANCE, L. G.

Recent advances in sugar-cane culture in Queensland.

Emp. J. exp. Agric., 1951, 19: 13-25, bibl. 16, illus.

Following an introduction in which climate, labour and implements are discussed briefly, the development of the Australian sugar industry is reviewed under the following headings: cane breeding and varietal work, soil fertility investigation, the use of benzene hexachloride, and disease control. Under breeding it is noted that extensive use has been made of such wild canes as *Saccharum spontaneum*, *S. berberi* and *S. robustum* for crossing with noble varieties, *S. officinarum*. *S. robustum* in particular has attracted attention, because its natural habitat, New Guinea, is climatically similar to North Queensland. The progeny of nobilized spontaneums from India and Java, notably Co.270 and 290 and P.O.J.2725 and 2878, have been particularly successful. Over the past 16 years steadily increased use has been made of canes containing wild blood. Under soil fertility investigations it is mentioned that, whereas P used to be considered the main nutrient deficiency, there are now indications that the need for K is becoming much more marked. Among the minor elements only Cu has so far been found deficient; this gives rise to droopy top disease, which responds favourably to a soil application of 56 lb. copper sulphate per acre before planting. The use of benzene hexachloride is discussed with reference to the control of the "greyback" grub, the frenchi grub and wireworm. Under disease control reference is made to legislative measures which have prevented the spread of several serious diseases. Possibly the only disease which has been controlled by fungicidal or other direct treatment is "pineapple" disease (*Ceratostomella paradoxa*), against which dipping the setts in organic mercurial compounds gives effective protection.

3052. FOSTER, C. B.

The yield of sugar cane in Barbados in 1950. *Bull. Dep. Sci. Agric. Barbados* 15, 1950, pp. 14.

A record crop of 158,183 tons of sugar was produced from 41,241 acres. Detailed tables are given of the acreage and yield of the principal varieties in the low, intermediate and high rainfall areas. B.37161 still occupies over 90% of the planted area, but the yield of B.41211 has been very satisfactory in all areas and this variety should, it is considered, be planted more extensively. C.W.S.H.

3053. STEVENSON, G. C.

Report on a visit to British Guiana.

Bull. B.W.I. centr. Sugar cane Breed. Stat. Barbados 34, 1951, pp. 7, bibl. 8.

The acreage under the Barbados variety B.34104 has risen from 2% to 75% in 5 years. Breeding in British Guiana has been discontinued and annual importations from the Barbados Breeding Station are being made.

Of new importations B.41227 and B.37161 seem likely to outyield B.34104 in areas suited to them. Leaf scald disease has lately appeared. Spread is largely through diseased planting material and knife infection. Active steps are being taken to assess the susceptibility of Barbados and other varieties. More than 100 Barbados varieties are to be tested. B.41227 promises to be much more resistant than B.34104, though it is pointed out that several features of the distribution of the disease indicate that even B.34104 shows considerable resistance. C.W.S.H.

3054. WIGHTMAN, G. M.

Variety position in the cane yield survey with some observations on the newer varieties.

Jamaican Ass. Sugar Tech. J., 1948, 12: 14-20 [received 1951].

A mosaic-free nursery of B.34104, the most useful general purpose cane, has been established in Jamaica. B.37172 has proved useful in areas of high rainfall. B.4362 is mentioned as the best of the new B'43 series, showing definite mosaic resistance.

3055. MUKHERJEE, S. K.

Search for wild relatives of sugarcane in India.

Int. Sugar J., 1950, 52: 261-2, bibl. 11.

As a result of exploration work in South India and Bengal 215 types of wild sugar cane and sugar cane relatives have been collected at Coimbatore. These consist of 125 types of *S. spontaneum*, 20 of *Erianthus arundinaceus*, 1 each of *E. ravennae*, *E. munja*, *E. fulvus*, *Miscanthus nepalensis* and *Narenga porphyrocoma*, 11 of *Sorghum halepense*, and 54 of other grasses. The probable range of useful characters to be found in the present collection is indicated.

3056. KING, N. J.

The cultivated and wild canes of New Guinea.

Cane Grs' quart. Bull., 1951, 14: 116-19, illus.

Early expeditions from Australia brought back the varieties Badijo, Mahona, Gorus, Oramboo, Korpi and Nanemo. Wild canes, *S. robustum* and *S. spontaneum*, have also been brought from New Guinea and used for breeding for vigour and disease resistance. Wild canes grow from sea level to 8,000 ft. Another party which will shortly visit New Guinea will, in particular, search for early maturing varieties with high vigour, good ratooning, disease resistance and ability to arrow. C.W.S.H.

3057. ARTSCHWAGER, E.

The role of the ligule in sugarcane taxonomy.

Amer. J. Bot., 1951, 38: 144-6, bibl. 5, illus.

The ligule of sugar cane is a membranaceous appendage attached at the junction of blade and sheath. At first glance it appears to have a simple shape and structure, but a closer study reveals details which constitute valuable taxonomic characters. The basic ligular pattern—linear, deltoid, crescentiform, and arcuate—is constant for a given clone but varies greatly within varietal and species limits. The dorsal pubescence is often limited to certain definite hair groups which are of great value in substantiating determinations made on other features. Ligules may be preserved for herbarium purposes by mounting them on glass slides or cardboard with the aid of Scotch tape, an easily

applied transparent sealer. [Author's summary.]—U.S.D.A. Field Stat., State College, New Mexico.

3058. HARTT, C. E., AND BURR, G. O.

Carbohydrate formation by sugarcane fed radioactive carbon dioxide.

From abstr. in *Amer. J. Bot.*, 1950, 37: 678.

Portions of sugar cane blades were fed radioactive carbon dioxide for 10 min. in the dark followed by periods in artificial light ranging from 5 sec. to 5 min. Light intensity at the leaf surface after passing through $7\frac{1}{2}$ in. of water was 5,000 f.c. Blades were killed in the dark by being dropped into boiling 95% alcohol. Fractions were prepared and counted with a Geiger counter. The fraction with the highest specific activity in the dark was the ammonium oxalate extract. Other fractions radioactive in the dark were the sugars, the water extract, and lignin. The specific activities show that free glucose gained in the light before sucrose or the acid hydrolysate, and cellulose became radioactive still later. All the fractions were very radioactive after 5 min. in the light.—Exp. Stat. Hawaiian Sugar Planters' Ass., Honolulu.

3059. SHAH, R.

Negatively geotropic roots in water-logged canes.

Sugar, N. York, 1951, 46: 1: 39, bibl. 2, illus.

Two non-flowering canes, Co.442 and B.3013, were subjected to waterlogged conditions for more than 12 months at Coimbatore in an unsuccessful attempt to make them arrow. Under these adverse conditions B.3013 gave a very poor performance, whereas the general development of Co.442 was excellent. On examination it was found that the latter possessed the faculty of producing numerous negatively geotropic roots, the tips of which emerged above the soil surface.

3060. CLEMENTS, H. F.

Relation of sugar cane growth to soil moisture tension.

Bien. Rep. Hawaii agric. Exp. Stat. 1948-50, 1951, pp. 129-31.

The water relations of sugar cane have been under investigation for 5 years on a soil with a wilting point of approximately 24% and a field capacity of approximately 37%. The growth of both plant and first ratoon canes fell off sharply when the soil moisture tension rose above 0.30 atmospheres, corresponding to 28% soil moisture. Temporary losses of growth, however, if corrected early, were made good by accelerated growth when soil moisture was increased to maximum field capacity (37%) or slightly more. Following this burst of growth, the rate declined again when soil moisture dropped to 35%, but increased again to a second maximum on the range 29% to 31% which seemed to be optimal for growth under these conditions. It is not clear whether the reduction in growth from 37% to 35% was merely an after-effect of the earlier burst of growth or a reflection of the accumulated effects of near saturation. Experiments are now in progress to determine the point at which irrigation must be applied to avoid unrecoverable losses in growth.

3061. CHRISTIE, G. A.

Some notes on cane irrigation.

Cane Grs' quart. Bull., 1951, 14: 113-15; illus.

An account is given of the irrigation of sugar cane fields in Queensland. Cane requires $1\frac{1}{2}$ acre inches of water to pass through the plant per ton of cane, or 50-60 inches for a 40-ton crop. With limited rainfall and irrigation supplies, therefore, loss by run-off, seepage and evaporation must be reduced to a minimum. Water is obtained from streams or pumped from deep wells. In the latter case the water may contain injurious chemicals. Irrigation water is passed from feeder drains down the cane drills. The feeders should not be more than 4-8 chains apart. Cane grows most rapidly at temperatures above 70° F., and below this temperature irrigation should be restricted.

C.W.S.H.

3062. TURNER, P. E.

The four main agricultural soil groups of the sugar-cane areas of Jamaica. Cultivation and drainage requirements of the soil groups.

Jamaican Ass. Sugar Tech. J., 1948, 11: 15-37 [received 1951].

The sugar cane soils of Jamaica can broadly be classified as follows: (1) Soils with a permanent natural tilth and free natural drainage, which do not need to be ploughed or knifed before replanting, and which do not need drains within the field. (2) Soils which slowly lose their tilth during the crop cycle, and need ploughing or knifing and require drainage. (4) Soils of poor natural tilth, which require both ploughing and knifing and an elaborate drainage system. (3) Soils which should be neither ploughed nor knifed but need drains within the fields. These soil types and the sequence of cultivation and drainage operations are described in some detail, with notes on heavy crawler tractors, rotary hoes and draining machines and on contour cultivation on undulating land.

3063. SAMUELS, G.

Sugar cane and the soil.

Bett. Crops, 1950, 34: 10: 25-6, 41-2.

Reasons are sought for the fact that, although sugar cane is grown continuously on many different soils in different parts of the world, it is not found to be a soil-depleting crop. When the crop is properly managed and fertilized, soil organic matter is maintained. Yields must, however, be maintained by the proper use of fertilizers, and it was shown in Puerto Rico that 57 lb. NH_3 , 20 lb. P_2O_5 and 12 lb. K_2O were removed by the canes of a 40-ton crop. Nitrogen is thus the major limiting factor in the production of high yields of sugar cane. The phosphorus requirement is low, but the potash requirement is normally higher than is shown by the figures cited. Minor element deficiencies are rare.

C.W.S.H.

3064. ROBINSON, J. B. D.

Manurial trials with sugar cane in Barbados. II.

Bull. Dep. Sci. Agric. Barbados 14, 1949, pp. 14 [received 1951].

An experiment in which 2 cwt./acre of sulphate of ammonia, superphosphate and muriate of potash in

varying combinations were compared with unfertilized controls and a series of experiments to test the effect of high ammonia dressings are described. In the first experiment, on clay loam, there was no response to P or K, but a significant response to N with the first ratoon. With the second ratoon low rainfall (41 in.) prevented responses to N. In the high N experiments (using 3, 4, 5 and 6 cwt. sulphate of ammonia per acre) deficiency of rainfall also prevented response in the 1946-8 plant cane season. Plant canes in 1947-9, however, showed responses on black soils and 1948-9 ratoons showed responses on both black and red soils. Recommended dressings are 3 cwt./acre on black soils and 4 cwt./acre on red soils. C.W.S.H.

3065. DONALDSON, J. H.
Nitrogenous experiments carried out by
Monymusk research staff.
Jamaican Ass. Sugar Tech. J., 1948, 12:
4-14 [received 1951].

Three methods of determining the N requirements of sugar cane are described. With growth measurements in the field no correlation between growth and ultimate yield was obtained until the fourth month, when it was too late to make good any N shortages. Pot tests gave inconsistent results, but investigations are to continue. Foliar diagnosis, based on the third open leaf, gave promising results from which it would appear that 1.84% N is the critical value.

3066. DE SORNAY, P.
Le sodium dans les plantes. (Sodium in
plants.)
(Publ.) *Chilean Nitrate Corp. agric. Serv.*,
1949, pp. 18, bibl. 8.

The importance of sodium in plant nutrition, particularly in sugar cane, is discussed. The sodium contents of 20 species of plants are tabulated.

3067. SMITH, N. M.
A fertilizer distributor adaptation.
Cane Grs' quart. Bull., 1951, 14: 97, illus.

International Harvester fertilizer hoppers have been fitted to Ferguson tractor toolbars and operated by a land-wheel drive. Distribution ceases when the wheel is power-lifted with the toolbar. Distribution can be combined with cultivation, the fertilizer being placed on each side of the row close to the sugar cane stools. C.W.S.H.

3068. ADSUAR, J.
Preliminary report of a mosaic disease of the
resistant sugar cane variety Mayagüez 336.
*Tech. Pap. P.R. agric. Exp. Stat. Rio
Piedras 7*, 1950, pp. 9, bibl. 1, illus.

A virus disease found attacking the sugar cane variety Mayagüez 336 in Puerto Rico is described. This variety, so far as is known, is resistant to ordinary sugar cane mosaic. The leaf symptoms are green blotches on a yellowish background. The virus, referred to as YM-336, is transmitted through the setts.

3069. WAHID, M. A., STEIB, R. J., AND CHILTON,
S. J. P.
Effect of fungicides on the development of
red rot of sugar cane.
From abstr. in *Phytopathology*, 1951, 41: 37.

In an attempt to reduce latent infections of *Colletotrichum falcatum* occurring in the bud and leaf-scar tissues of sugar cane, a 10% dust containing either Zerlate, Fermate or Parzate was applied to growing canes of Co.290, 5 to 10 times, at weekly intervals beginning when joints appeared. Subsequent examination showed that dusting had reduced the incidence of, but not eliminated, the fungus in leaf scar and bud tissues.

3070. CARVALHO, R. DE S.
Carvão da cana. (Sugar cane smut.)
*An. Esc. sup. Agric. "Luiz de Queiroz",
Piracicaba*, 1949, 6: 1-12+8 figs. [received
1951].

Information is given on the recent appearance of sugar cane smut (*Ustilago scitaminea*) in the Alta Sorocabana district of Brazil, and on the control measures that are being considered (destruction of susceptible varieties and propagation of resistant ones).

3071. HUGHES, C. G.
Yellow spot disease.
Cane Grs' quart. Bull., 1951, 14: 103-5,
illus.

This paper records the appearance of yellow spot disease (*Cercospora kopkei*) in North Queensland in 1950. There is only one record in South Queensland. Trojan and Eros varieties are most susceptible, P.O.J. 2878, Comus and S.J.4 less so. Pinder, Q.44 and Q.50 appear to be the least susceptible. At present it is recommended that no plants be taken from diseased fields, and that, particularly where the soil remains wet for long periods, the more resistant varieties should be planted. C.W.S.H.

3072. ANON.
Introducción de insectos beneficiosos para
combatir una plaga grave de la caña de
azúcar en Venezuela. (Biological control of
a serious pest of sugar cane in Venezuela.)
Agric. venezol., 1950, 15: 146: 40-2, illus.

An account is given of the work that is being done by the Ministry of Agriculture, Maracay, on the biological control of the sugar cane moth borer (*Diatraea* spp.). Several species of *Diatraea* occur in Venezuela. Prospects for controlling *D. saccharalis* by means of the Amazon fly are good, but it is not yet known whether this parasite will also control the other species.

3073. JUANTORENA, J.
Informe sobre "la candelilla". (A note on
the sugar cane frog hopper.)
Agric. venezol., 1950, 15: 143: 46-7, bibl. 8.

Information is given on the biology of the frog hopper, *Tomaspis beodkini*, and its control. Preventive measures recommended in Venezuela include eradication of weeds, clearing of ditches, etc., efficient drainage, continuous irrigation, and dusting. Gammexane, DDT and mixtures of the two have given good results.

Tea.

(See also 2973, 3088h, n, 3114, 3130, 3138.)

3074. KEHL, F. H.
The effect of manure on the rooting of
internode cuttings.
Tea Quart., 1950, 21: 2/3: 36-7.

Although cuttings have made vigorous growth in well manured beds receiving frequent applications of liquid manure, it was noted that the rooting percentage was steadily decreasing. An experiment showed that the number of cuttings rooted was more than doubled when unmanured soil of good texture was used. It is suggested that rooted cuttings from unmanured beds could be transplanted into manured beds, or that highly manured beds could be rested from time to time, or that the top 4-6 in. of manured beds could be made up with unmanured soil. C.W.S.H.

3075. PERKINS, G. G.

A method of bringing tea plants into bearing without centering.

Tea Quart., 1950, 21: 2/3: 4, illus.

A method is described in which tea seedlings, instead of being centred, are bent over parallel to the ground and pinned down with a forked stick. This is done when the seedling is 1 ft. high and pencil thickness at the base. Young shoots develop quickly and are tipped at a suitable height to form a plucking table. C.W.S.H.

3076. ALI-ZADE, M. A.

Irrigating tea in the Lenkoran-Astara zone of the Azerbaidzhan S.S.R. [Russian.]

Doklady vsesojuz. Akad. sel'sk. Nauk, 1950, 15: 12: 30-2, bibl. 3.

In this region (on the south-west coast of the Caspian Sea) the average yearly rainfall is 1,324 mm., but 1,131 of this falls in September to April so that the summer months are too dry and unfavourable for satisfactory leaf development of tea bushes. Data are given showing the increased production of green leaf obtained from irrigations carried out in June, July and August.

3077. SCHWEIZER, J.

De situatie inzake de blisterblight-ziekte van de thee op Sumatra's oostkust. (The blisterblight situation on the east coast of Sumatra.)

Bergcultures, 1950, 19: 207-11.

A tour of inspection of the tea districts on the east coast of Sumatra was made in March, 1950, by a group of specialists, and their observations and recommendations are reported here. The effect of ground cover and shade on the development of the disease was very marked. On estates higher than 900 m. the best control is obtained by the elimination of shade and clean weeding, but as these practices are detrimental to the well-being of the tea a compromise is advocated. Good direct control has been obtained by the use of copper fungicides, but further experimental work is necessary to determine the most efficient type of apparatus and the best time for spraying. Various species are recommended for trial as shade trees or ground cover. The selection and propagation of resistant clones is considered to be an urgent necessity.

3078. LOOS, C. A.

Studies in blister blight control. Part II. Preliminary results of tests with fungicides.

Tea Quart., 1950, 21: 2/3: 13-27.

Perenox (a cuprous oxide preparation) has been used as the standard copper fungicide. A proprietary copper oxychloride formulation (Blitox) was found to give as

good protection as Perenox. A concentrated copper preparation (80% copper) did not give any better protection than Perenox. Copper fungicide spraying has been successful with tea recovering from pruning in experiments in an area receiving the N.E. and S.W. monsoons and in an area receiving the N.E. monsoon only. In the former area July-September spraying followed June pruning, while in the latter October-December spraying followed September pruning. The concentration used was 4 oz. fungicide in 10 gal. water. Attempts to find an organic fungicide for tea in plucking have been unsuccessful. Spraying copper fungicides weekly or fortnightly is equally successful, but the procedure cannot be recommended during plucking until investigations on the amount of copper residue left by spraying are completed. C.W.S.H.

3079. PORTSMOUTH, G. B.

Studies in blister blight control. Part III. A warning regarding the possible dangers attendant on the continued adoption of pruning into the dry weather as an agricultural control measure.

Tea Quart., 1950, 21: 2/3: 27-9.

Pruning so that recovery will take place in a dry and mist-free part of the year has been a good agricultural control measure against blister blight, but it has the disadvantage that the bushes may suffer from sun scorch and drought. It is recommended that, to prevent the former, prunings should be piled on top of the bushes. To reduce the drought effect neither the forking in of prunings nor drastic cutting out of shade trees should be undertaken. C.W.S.H.

3080. DIKE, H.

Studies in blister blight control. Parts IV and V. Mechanical dusting against blister blight, Sections 1 and 2.

Tea Quart., 1950, 21: 2/3: 29-36, illus.

A description is given of a "whirlwind duster" which was used to distribute a new 2% copper dust, known as "Cuprosana 2", for the control of blister blight. Experiments showed that dusting was more efficient than spraying as regards maximum working range. A trial of the effectiveness of the dust in blister blight control suggested that weekly applications of 7-10 lb. dust per acre on the day following plucking was economic during the first and second years after pruning, but that 5-6 day dustings might be more effective. The copper content of the manufactured tea is a difficulty, and it is emphasized, in a note by the editor, that rain between dusting and plucking is necessary to remove excess copper. C.W.S.H.

3081. D[AS], G. M.

Red spider.

Serial Tocklai No. 71, 1950, pp. 7.

Red spider (*Paratetranychus bioculatus* W.M.) is the most injurious pest of tea in North-East India, and is widely distributed in all tea-growing districts. Part I of this publication sets out various aspects of its biology, and Part II deals with control measures, with particular reference to the use of sulphur preparations.

3082. FAY, B. D.

The mechanical plucking of tea.

Tea Quart., 1950, 21: 2/3: 38-44, bibl. 1, illus.

Tarpen croppers for tea plucking have been electrically powered from a portable generator through long flexes. A new model is mentioned in which power is transmitted through a flexible drive from a fractional h.p. motor on the operator's back, thus giving complete independence of movement to the operator. Experiments are described in which hand plucking was compared with the electrically powered croppers. In one experiment plucking was at 10-day intervals; in the other an attempt was made to pluck when the individual treatments were considered ready for plucking. In the first experiment there was little yield difference between treatments, but in the second hand plucking gave the highest total yield, though this was thought to be due to lack of experience in determining the best time intervals for mechanical plucking. There was an improvement in the spread of the mechanically plucked bushes. Quality comparisons were inconclusive, though mechanical plucking caused deterioration in appearance. Cost comparisons favoured hand plucking in the low crop (January) and machine plucking in the high crop (March). C.W.S.H.

3083. OPARIN, A. I.

Preparation of tea concentrates from rough tea leaves. [Russian, English summary $\frac{1}{2}$ p.] *Biohimija*, 1944, 9: 90-100, bibl. 4 [received 1951].

The rough tea leaves which are cut every year in the spring from the tea bush are a large and as yet unutilized source of material. It is so coarse that it must be specially treated, but a method is described by which it is claimed that a satisfactory tea extract can be obtained. —Moscow Univ.

Other crops.

3084. ALVAREZ GARCÍA, L. A.

Anthraxnose of the Annonaceae in Puerto Rico.

J. Agric. Univ. Puerto Rico, 1949 (issued November 1950), 33: 27-43, bibl. 8, illus.

This disease, caused by *Colletotrichum (Gloeosporium) gloeosporioides*, seems to be correlated with high relative humidities and is responsible for a constant drop of flowers and fruits, a die-back of twigs and branches and damping-off of seedlings of soursop, *Annona muricata*, wild soursop, *A. montana*, wild bullock's heart, *A. glabra*, bullock's heart, *A. reticulata*, and sweetsop, *A. squamosa*, growing in Puerto Rico. While results of trials have shown that weekly sprays with Zerlate, Fermate, Phygon and bordeaux mixture will control the disease, it is suggested that these fruits should not be planted on a commercial scale in the humid parts of the country.

3085. VICENTE ARBOLEDA, J., AND SERRANO, C. Contribución a la propagación con el método de la planta madre. (A contribution to the study of the "mother plant" method of propagation.) [English summary, 3 lines.] *Acta Agron., Palmira*, 1950, 1: 49-50, bibl. 5, illus.

The "mother plant" method of propagation [see H.A., 20: 3226] is a modified method of aerial layering that has given excellent results in the rooting of [coffee] cuttings. In experiments carried out at the Agricultural Experiment Station, Palmira, cuttings of *Flacourtia*

ramontchi, the tropical Governor plum, taken by this method and treated with 0.2% α -naphthaleneacetic acid, rooted 100% in 7 weeks. Only 5% of the untreated controls rooted in the same time.

3086. HADIWIDJAJA, T.

Over meeldauw bij de rambutan. (A powdery mildew on rambutan.) [English and Javanese summaries, $\frac{1}{2}$ p. and 1 p. resp.] *Landbouw*, 1950, 22: 245-57, bibl. 13, illus.

In 1949, attacks of powdery mildew, caused by a species of *Oidium*, were recorded for the first time in Indonesia on rambutan trees, *Nephelium lappaceum*. The disease was only observed around Bogor and Djakarta. The mildew attacked flowers, fruits and the young leaves of watershoots, causing them to drop. Since the fungus is probably specific to this host plant, it has been named *O. nephelii* nov. sp. Varieties were observed to differ considerably in susceptibility, Silengkeng being very susceptible and Sinjonja comparatively resistant. Control experiments with sulphur dust are to be carried out.

3087. MACMILLAN, W. G., AND CHAKRAVERTI, I. B.

Studies on tamarind seed kernel powder: Part I.—Preparation and utilization as a sizing material in the jute industry. *J. sci. industr. Res. India*, 1951, 10, Sect. B, pp. 13-18, bibl. 4, illus.

The tamarind tree (*Tamarindus indica*) grows extensively throughout India, producing about 220,000 tons of fruit annually, about 60% of which is seed. So far little use has been made of the latter, but its commercial possibilities seem considerable. The utilization of the seed as a sizing material in the jute industry is described and illustrated.

Noted.

3088.

a ALARCON, P. J.

Observaciones sobre el contenido de humedad del grano de café. (Observations on the moisture content of coffee seeds.) From abstr. in *Bol. inf. Colombia*, 1950, No. 12, pp. 10-11.

b BARNES, A. C.

Mosaic disease of sugar cane in Jamaica. *Jamaican Ass. Sugar Tech. J.*, 1948, 12: 59-65 [received 1951].

c BOURIQUET, G.

Les maladies des plantes et la végétation à Madagascar. (Plant diseases in Madagascar.) *Rev. int. Bot. appl.*, 1951, 31: 213-26, bibl. 33, illus.

d CASTAÑO A., J. J.

Un hongo del género *Chalaropsis* parece corresponder al estado conidial del Ceratostomatóceco aislado de las lesiones de cafetos con "macana". (A fungus of the genus *Chalaropsis* appears to correspond to the conidial stage of the Ceratostomataceae isolated from lesions of infected coffee trees.) *Bol. inf. Colombia*, 1950, No. 10, pp. 25-33, bibl. 10, illus.

- e FRANCO, R. M.
Sanidad y defensa de las plantaciones de café en el país. (*The health and protection of coffee plantations in Colombia.*)
Bol. inf. Colombia, 1950, Nò. 7, pp. 22-7.
- f GOMEZ QUIROGA, F.
Estudio económico sobre 30 fincas cafeteras de las regiones de Chinchiná y El Quindío. (*An economic study of 30 coffee plantations in the districts of Chinchiná and El Quindío [Colombia].*)
From abstr. in *Bol. inf. Colombia*, 1950, No. 3, pp. 13-14.
Statistical data on methods and economics of coffee production.
- g LEROY, J. F.
Note sur les noyers (*Carya et Annamocarya*) sauvages d'Indochine. (A note on the wild nuts (*Carya* and *Annamocarya*) of Indo-China.)
Rev. int. Bot. appl., 1950, 30: 425-8, illus.
- h LHOMME, E. J.
Technologie du thé. Essai d'amélioration de la préparation des thés verts du Haut-Donnai. (*Tea technology. Trial for improving the preparation of the green tea of Haut Donnai.*)
Arch. Inst. Rech. Agron. Indochine, 1950, No. 1, pp. 60, illus.
- i MACKAY, J. W.
Mosaic-free nurseries—B.34104.
Jamaican Ass. Sugar Tech. J., 1948, 11: 2-8 [received 1951].
- j MENDIOLA, N. B.
Agricultural research in Formosa before 1945.
Philipp. J. Agric., 1949 (published 1950), 14: 287-305.
- k NEWTON, R. G., AND OTHERS.
Variability of Malayan rubber.
Industr. engng Chem., 1951, 43: 329-34.
- l R., D. E.
Dried banana products.
Colon. Plant Anim. Prod., 1950, 1: 237-41, bibl. 5, and in text.
- m RAMIRO, M. P.
Suitability of manila hemp waste for paper making material. 1. Pulping of manila hemp waste by the soda process.
Philipp. J. Sci., 1949, 78: 355-64, bibl. 5.
- n ROBERTS, E. A. H., AND WOOD, D. J.
The fermentation process in tea manufacture. II. Oxidation of substrates by tea oxidase.
Biochem. J., 1950, 47: 175-86, bibl. 31.
- o SCHMIDT, E., AND KELSEY, R. H.
Creaming latex with ammonium alginate; influence of particle size.
Industr. Engng Chem., 1951, 43: 406-12, bibl. 13.

NOTES ON BOOKS AND REPORTS.

Books.

3089. AUDAS, J. W.
The Australian bushland.
W. A. Hamer Pty., Melbourne, Australia, 1950, 9×5½ in., pp. 712, illus. 84s. (Australian.)
- Mr. Audas's voluminous book on the Australian bushland has evidently been a labour of love. His passion for Australian flora is only equalled by the breadth of his knowledge and the assiduity with which, in the course of a long lifetime, he has collected and classified an immense range of indigenous and imported plants. The first part of the book is devoted to a description of the flora of most of the Australian States and to an account of his botanical journeys, made over a long period of years, throughout the continent. His declared object is to further the discovery and use of plants of economic importance. His undeclared object is to refute the contention that botany, to the layman, is a "dry" subject, by attempting to write a popular book which will have a wider appeal than a mere textbook. And he also hopes that the book will be of use to students. Unfortunately it is impossible to achieve all these objects at the same time. The practical farmer or applied botanist, although finding much of value, will regret the author's admonitory paragraphs of advice. An excellent index will enable the student to use it as a reference book, but the surrounding layers of popular information and the oddly confusing arrangement can only be a source of irritation. Mr. Audas would do

well to write a book for the expert or a book for the student and let the public go hang. J.H.S.

3090. BODENHEIMER, F. S.
Citrus entomology.
Dr. W. Junk, The Hague, 1951, 10¼×7½ in., pp. 663, bibls. in text, illus., 56 guilders.
- This comprehensive work deals exclusively with the insects and allied animals associated with citrus in the Middle East, with special reference to the citrus groves of Egypt, Iran, Irak, Palestine, Syria and Turkey. The first part of the work is devoted to the history and extent of citrus cultivation in Palestine, and also gives a general survey of the animal-community of citrus groves. Then follows a brief review of the zoogeographical and ecological distribution of citrus pests in general in Palestine and other countries of the Mediterranean Basin, a separate section being devoted to the distribution of the citrus coccids. A very useful innovation is the inclusion of a symptomatic key to the citrus pests of Palestine, which enables the farmer with no special entomological training to determine the species concerned by means of the damage symptoms. The second part of the book discusses in considerable detail the life-cycles, damage, and control of the insects and other citrus pests of Palestine. Each of the important species is dealt with at length. For example, an account of the Mediterranean fruit fly occupies sixty-five pages, and the synonymy, description and distribution, life-cycle, host relations, physical ecology, distribution and density of populations, damage, control and biological control are some of the aspects

discussed. The citrus mites are referred to in some detail, but it is obvious that this important group must be studied in greater detail before their economy can be fully understood.

This work is complementary to that published recently by Walter Ebeling of California entitled *Subtropical Entomology*, and together they provide a very comprehensive survey of the citrus pests of the world.

A.M.M.

3091. CONDIT, I. J.

A bibliography on the avocado (Persea americana Miller).

(Publ.) Calif. Citrus Exp. Stat. (published by California Avocado Society), 2nd edition, 1950, 10½ × 8 in., pp. 372. Mimeographed.

The first edition of this useful bibliography appeared in 1939 [H.A., 10: 413]. In this new edition it has been much enlarged and brought up to date. The arrangement, as before, is by subjects, with the addition of sections on tree decline in Texas. An author index is provided.

3092. DAKERS, J. S.

Annals for garden and greenhouse.

Collingridge, London, and Transatlantic Arts, New York, 1951, 8½ × 5½ in., pp. 140, illus., 8s. 6d.

The student, uplifted or depressed, according to temperament, by a somewhat lyrical first chapter, will find in those to follow that the cackle has wisely been cut in favour of business-like attention to the 'osses. The plan of the book is to treat the several classes of annuals separately, hardy, half-hardy, greenhouse, climbers, etc., concluding with an annotated list of a large number of species having horticultural value. Many of these, of course, have improved garden forms not mentioned here but easily found in seed catalogues. In the advice on cultivation two points are rightly emphasized, the importance of sparse and shallow sowing and, later, of drastic thinning. Sweet peas are given a chapter to themselves, and so, less understandably, are everlasting flowers. The "Classified List" with which the book concludes is not a classified list but, better, an alphabetical one which contains helpful notes on some 120 genera of garden value. The book should do much to encourage an extended use of annuals in the garden, particularly if the directions given by the author are followed diligently and without scamping. The illustrations are clear but have an air of having been taken from stock. They would have gained in interest and originality if more of the lesser known species had been included. G.St.C.F.

3093. GROVES, J. R., AND MASSEE, A. M.

A synopsis of the world literature on the fruit tree red spider mite, Metatetranychus ulmi Koch and its predators.

Commonwealth Institute of Entomology, London, 1951, 9½ × 6½ in., pp. 180, bibl. 1039, 20s.*

It is not correct to regard this paper either simply as a reference list or as a summary of the published information on the fruit tree red spider mite. Miss Groves

has made an exhaustive and critical survey of the literature from about 1850 to 1947-8. The synopsis is divided into two parts, the first comprising over 800 papers dealing with mites of the tetranychid group, together with 217 papers on predators. The former section is made exceptionally useful by the inclusion of many papers not specifically referring to *Metatetranychus ulmi*, both because of the growing interest in all mites of this type, and because of the confusion of synonyms which have been applied to them. The literature on predators is more specifically confined to proven or suspected predators of *M. ulmi*. Each paper listed has a short summary under one or more headings, indicating at once the species dealt with and the particular approach of the paper such as: control, host, systematics, etc. The notes are a quite reliable guide to the value of a particular paper in providing information on a specific aspect, and will save much time in searching through the literature. The work is made additionally useful by the inclusion of many references, particularly of earlier dates, whose titles do not otherwise lead one to suspect information on mites at all. Much useful and otherwise unknown literature has been listed in this way, and reveals the thoroughness of the search made. The paper includes full cross references to authors and an index of subjects and species. There is a useful list of synonyms and common names of the tetranychids showing the multiplicity of names which has caused much difficulty to workers in this field. The introduction by Dr. A. M. Massee is an authoritative account of the history and importance of these mites, and the problems of controlling the damage they produce. It is to be hoped that supplementary synopses will be issued at intervals to cover new literature. J.W.L.B.

3094. HEDRICK, U. P.

A history of Horticulture in America to 1860.

Oxford University Press, New York, and Geoffrey Cumberlege, London, 1950, 9½ × 6 in., pp. 551, bibl. pp. 9, illus., \$7.50 or 45s.

Grapes of New York, Plums of New York, Cherries of New York, Peaches of New York; it must be nearly thirty years since American mailboats came staggering across the Atlantic, their holds stuffed with these huge green volumes going to every pomological library in Europe. With what delight we seized on each new volume in turn, gazing with rapture on the lovely coloured plates of luscious fruits, and dreaming of a garden city called New York, with its Statue of Liberty set deep in velvety orchards, and striding through them the already legendary figure of Professor Hedrick. And now here he is again, giving us the ripened fruits of his lifetime of research into the romantic history of American horticulture. And what a wonderful pageant he has made of it; first come the Red Indians, curiously domesticated to our Fennimore-Cooper-conditioned minds, living apparently so placidly with their 200 species of tree, bush, and vine fruits around them, most of which were growing wild. And here straight away the author strikes the keynote which rings all through the book: the vast indigenous horticultural wealth of America. When the Spaniards came in the sixteenth century they found nearly every fruit we know to-day, except citrus which they brought with them. As we follow in these pages the gradual unfolding of the

* Obtainable from Commonwealth Agricultural Bureaux, Central Sales Branch, Farnham House, Farnham Royal, near Slough, Bucks.

story in each of the main producing areas, we are struck primarily by what was already there, and secondarily by what was brought in from outside. No wonder the sober pilgrim settler, the Quakers and the Shakers, the reckless Captain John Smiths, the debonair generals, the eccentric and not-so-eccentric botanists, the presidents, the doctors, the nurserymen who came crowding across the stage to make their bow and then pass on into oblivion, no wonder these all fell victims in turn to the universal urge, the itch, to plant something, ever more and more different kinds and varieties of forest trees, of fruits and vegetables and flowers. Wonderful river valleys with their perfect climate and deep alluvial soils, lying there in all their primeval glory waiting to be inhabited. What romantic scenes they make, and what a host of romantic personalities as the story proceeds. Here comes the great George Fox, founder not only of the Quakers, but of one of the first Physic Gardens in Philadelphia. There goes Johnny Appleseed, travelling for forty years on foot, up and down the Ohio Valley, preaching and sowing apple pips for posterity. In the eighteenth century the scene is dominated by three veritable giants, for George Washington, Thomas Jefferson, Benjamin Franklin stride across the scene, planning, planting, grafting, scribbling in garden diaries, dictating meticulous directions for the development of their estates, till Vermont and Monticelli seem to take shape before our eyes. The giants come and go, but all the time, as the author is careful to remind us, it was the men who established nurseries who were usually the leaders in every division of gardening in a new country. And, indeed, in many cases the historian relies on nurserymen's catalogues for evidence of vital importance to the unfolding of the story. And when it is all over, and we are still gaping at the rich picture the author has painted, the chapter on plant breeding comes almost as an anticlimax. Why, one is almost tempted to ask, with all that wealth of indigenous horticultural material cluttering up the hedgerows—why drag in the geneticist? Two last chapters, dealing with horticultural literature and horticultural societies, bring this remarkable work to a close. Half a dozen documentary films lie here, waiting only for your direction, Professor. From across the Atlantic we salute your genius. Meanwhile, what a pity no one has thought of doing the same sort of thing for English horticulture.

N.B.B.

3095. HILLS, L. D.

The propagation of alpinas.

Faber & Faber, London, 1950, 9×5½ in., pp. 464, illus., 25s.

There is a plentiful supply of light literature on the subject of rock gardens from the general viewpoint, but this is the first really satisfactory work covering the propagation of alpinas; it deals delightfully with the fascinating systems used by nurserymen and both large and small scale gardeners. This is an extensive work, and the author has provided much detail with a seemingly effortless charm. In actual fact, the preparation of the book took over three years, numerous authorities were consulted and all the plant names are in line with the most recent Kew list.

The main propagation methods are described under the three heads: division, cuttings, and seed, each with

its "dictionary of propagation" containing hundreds of paragraphs of useful comment on individual plants. Layering is treated separately, and there is a valuable chapter on alternative unorthodox methods such as the use of powdered baked sphagnum and coal dust for seed raising, and of pumice, powdered glass, and the well-advertised vermiculite for cuttings. Potting soils and their ingredients are described in detail and their particular merits compared, and the plant's itinerary through potting shed and frame to the rock garden is carefully followed. Cutting-frame construction and exploitation is minutely described and illustrated. Soil sterilization procedure is well explained, including the use of a domestic steamer for a few pounds of soil and the large brick and iron erections for which clear plans are provided together with practical hints to the amateur builder. There is a wise chapter on the use of hormones to aid rooting and warnings as to their limitations. It is a pity that the useful instantaneous dip method is not mentioned; it should be included in a future edition. Finally an "encyclopaedia of propagation", containing details of species difficult to propagate or of unusual interest, extends to some fifty pages and contains numerous practical instructions and suggestions.

The author is to be admired for mentioning proprietary articles and for giving the full addresses of suppliers; he has even taken pains to list some of them in an appendix. The other appendix, "Botanical names with a glossary of special interest to the alpine gardener", being an account of uses of botanical Latin, is included for the benefit of those who have lived with plants rather than with books.

That one notices a few shortcomings should be an indication that the production merits criticism. Excellently indexed though it is, one misses sub-headings to aid rapid reference, and the text references to figures are far from complete; apparently this is not accidental. It is a pity that the interesting reference to saddle-grafting *Daphne petraea* is illustrated by an orthodox wedge graft.

In general, however, the work is excellent and is excellently set off by Maurice Wilson's beautiful line illustrations.

R.J.G.

3096. HUNTER, H. [AND CARSON, G. P.].

Crop varieties. Varieties of cereals, flax, potatoes, beans, and field peas.

Farmer and Stockbreeder Publications Ltd., Spon Agricultural Series, 1951, 8×5½ in., pp. 224, bibls., illus., 21s.

As the sub-title indicates, this book is concerned primarily with agricultural crops. It is a survey, written in a pleasantly straightforward and simple manner, of the problems of crop improvement, of the work that has been done in breeding and maintaining high quality varieties of the main agricultural crops, and of the present variety position in these crops. Such a concise and authoritative review should be of immense value to the farmer and to those interested in seed production.

Following an introduction on the general aims and principles of crop improvement, the situations with regard to barley, wheat, oats, rye, field beans and peas and flax are dealt with in turn. The final chapter, on potatoes, is written by Dr. G. P. Carson. In it he gives

a historical account of the introduction of the potato into Europe, deals briefly with the distribution and characters of the various species and gives notes on the more important commercial varieties and on the characters that determine quality. The rest of the chapter is devoted to potato diseases and the way in which plant improvement and seed certification have helped to overcome disease problems. In its concise presentation of a very complex subject, this book admirably maintains the standard set by the previous publications in this series.

P.R.-D.

3097. MARKHAM, E. (REVISED BY HELLYER, A. G. L.).

Clematis.

Country Life, London, and Charles Scribner's Sons, New York, 3rd edition, 1951, 8½ × 5½ in., pp. 126, illus., 18s.

This book, edited by that knowledgeable plantsman A. G. L. Hellyer, is the third edition since 1935, the second being brought out in 1939. In this new edition a great number of the plates have been changed, and the more modern production of these has led to a welcome improvement in clarity. The only thing they lack is colour.

There is a useful chapter on the history of the clematis, although unfortunately for the student the tropical clematis and all those which need glasshouse treatment have been ignored; otherwise this would have been a more valuable work on this fascinating subject. There is also an interesting chapter dealing with the use of the clematis in the garden, in which suggestions are made concerning the species and varieties most suitable for certain situations, but it would have been easier if the editor had stated which types he referred to as large flowered hybrids. The chapter on propagation is extremely valuable, and it is interesting to discover that cuttings root freely, some with and some without heat. Propagation by cuttings produces a plant which is less liable than the grafted plant to that terrible scourge, wilt.

Another very useful chapter which is included is the one on planting, which does not appear in the first edition. Anyone interested in plant hybridization will be spurred on to try his skill at this when he realizes, on reading Chapter 5, the ease with which this may be accomplished. The chapter dealing with the clematis as a cut flower is well worth noting, and especially the advice that part of the old wood should be cut with the flower, for many flowers take up water only through the younger wood. It is also interesting to learn that in Holland some varieties are used as a commercial cut flower. Varieties which may be used in this way are listed. The chapter on pests and diseases suggests remedies for most of those which worry the grower of these beautiful plants. A welcome addition is the chapter which explains pruning, a frequent cause of failure with amateurs who are forgetful whether the plant flowers on new wood or old and cut all wood indiscriminately away. The chapter which describes species and hybrids and lists varieties under their appropriate parent plant is very helpful. Useful for the professional and amateur gardener alike are the lists of clematis for the large and small garden, the species which are worth growing and the best of the herbaceous types. The book contains a well compiled

index. This is, indeed, a publication which all lovers of the clematis should obtain.

M.P.

3098. PERRY, F.

The garden pool.

Collingridge, London, and Transatlantic Arts, New York, 1951, 8½ × 5½ in., pp. 128, illus., 8s. 6d.

This small book summarizes in brief what the author's earlier work, *Water Gardening*, has expounded at much greater length, and does it very well. There are, it seems, many ways of constructing a garden pond and they are all quite competently dealt with here in a few pages. Aspirants whose constructional abilities are in abeyance will welcome an innovation in the form of a portable aluminium pond "light enough to be carried by a child". Attention is given to composts and planting: some initial care in this direction will be well repaid, and beyond this aquatics require little or no attention. The reader will, however, find a number of useful tips mostly directed to keeping the water in condition, for old still water which has become settled and balanced is something to strive for. The chapter on hardy water lilies is very complete, ending with a descriptive list of 83 varieties, classified according to colour and the surface area occupied by a well-grown plant. The chapter entitled "Other choice aquatics" with its wealth of unfamiliar names, will excite the cupidity of all curious gardeners. Equally fascinating is that on submerged aquatics. The fortunate few who possess a greenhouse tank or pool will find a selection of queer and beautiful exotics. Pools should be stocked with fish, if only for the part they play in keeping down mosquitoes and insect plant pests, and the most suitable fish and the necessary provision for their care and maintenance are described. Finally there are instructions for the proper use of bog and moisture-loving plants with which the surroundings of the pool should be embellished.

G.St.C.F.

3099. PHILLIPS, G. A. R.

The rock garden and alpine plants.

Collingridge, London, and Transatlantic Arts, New York, 2nd edition, 1951, 8½ × 5½ in., pp. 309, illus., 15s.

The book, published first in 1946, has now made a place for itself as a reliable guide to the solution of the many problems liable to confront the amateur rock gardener whose ambitions extend beyond aubretia. Part I deals with the construction of rock gardens and their attendant trimmings of pools and bogs, and contains much sound advice. Time was when the prevailing idea of a "rockery" was an earthen mound with assorted geological specimens, ranging from Cambrian to concrete, protruding vertically from the surface like almonds in a pudding. The construction of a present day rock garden calls for much hard labour and much hard cash, and it is better to inherit than to build one. But if building must be undertaken the principles and precepts thereof will be found in quantity in this book, together with some grim photographs of the work in progress which will certainly give the weakling pause. Part II, which forms the major portion of the book, is entitled "What, when and how to plant" and sustains the title very competently. Certain popular groups, such as primula and saxifrage, are treated separately

and at length and the rest are grouped in chapters according to season of flowering, a somewhat confusing arrangement which may cause the reader to thank heaven for the index. Separate chapters are devoted to annuals, bulbs, shrubs, hardy orchids, ferns, the alpine house and various types of fancy containers such as window boxes and sinks. The lengthy annotated lists of plants for various situations should prove useful and seem to have left little out. The book may not tell the expert much that he does not know already, but for the interested amateur it would be hard to find a better.

G.St.C.F.

3100. RUSSELL, SIR E. J. (REVISED BY RUSSELL, E. W.).

Soil conditions and plant growth.

Longmans, Green, London, New York and Toronto, 8th edition, 1950, 9 × 6 in., pp. 634, bibl. in text, illus., 35s.

Sir E. John Russell's *Soil Conditions and Plant Growth* first appeared in 1912, and in its various editions has been accepted as the standard textbook on the subject. Soil scientists have eagerly awaited the publication of this eighth edition, revised by Dr. E. W. Russell, son of the original author. The revision has been thorough, in fact all except the first chapter (Historical and Introductory) has been recast and rewritten. This prodigious task has been brilliantly carried out, and the result is a book which will be indispensable to all who are interested in the way in which the growth of plants is affected by the soil.

After the historical introduction, three chapters are devoted to the nutrient requirements of plants, including a consideration of each of the essential elements in turn and a section on the interaction of nutrients. The composition and properties of the soil are dealt with in chapters 5-8, including sections on pH and on the effect of fertilizers on the soil.

Next follows a long section on soil biology which covers the whole field from bacteria to earthworms and even mammals, including excellent discussions on the physiology of the microbial population, on soil ecology and on associations between plants and micro-organisms. This leads naturally to a chapter on the decomposition of plant material, including a useful discussion of green manuring, and hence to the subject of the composition of soil organic matter. A comprehensive account of the nitrogen cycle, containing a section on the importance of leguminous plants, occupies the longest chapter in the book. With chapter 17, the subject changes abruptly to soil physics. Soil temperature is briefly but adequately dealt with, but one could wish that it had been possible to give a more detailed discussion of the soil atmosphere. On the other hand, the four chapters on soil moisture cover the subject fully and provide a most useful account of the modern interpretation of water relationships of soils and plants. The physics section ends with an interesting chapter on soil structure, including the effect of cultivations and growing crops and the mechanism of crumb and clod formation.

The theme changes again in chapter 24, which concerns the development of plant roots and includes references to root studies on fruit trees. Following naturally from this are chapters devoted to the uptake of nutrients and water by the roots, to the sources of nutrients in

the soil, and to the effect of pH on plant growth. Then, turning from the effect of soil conditions on plant growth, chapter 28 is concerned with the opposite effect, that of the plant on the soil. The uses of leys are discussed, and a section on the interaction of plants growing together leads to a mention of the reasons for cover cropping in orchards.

Soil formation is dealt with in chapters 29-31, and the next two chapters are devoted to saline and alkali soils and their management. Chapter 34 deals solely with erosion control, the other aspects of soil management being discussed in the next two chapters. Thus, chapter 35 deals with methods of soil cultivation and includes a section on mulches and shade-trees. The effects of mulches are of particular interest to fruitgrowers, but there is no mention of the non-cultivation system of soil management involving the use of weedkilling sprays, which is being widely used in Californian citrus plantations. The final chapter summarizes the essential conditions for fertility, and discusses the soil management methods necessary for maintaining fertility in different types of soil.

The book is easy to read, despite a few grammatical idiosyncrasies. For a book of this size, there are comparatively few errors, but it should be noted that the reference half-way down p. 18 should be to p. 14, not to p. 12, and that on p. 398 the plate referred to is XVII, not XXII. The caption to Plate II appears to be incorrect as the result of an error in punctuation, while on p. 570, line 1, "finer" should surely read "coarser". But these are minor blemishes. A more serious defect is that one cannot always find what one wants by using the index. There is no separate bibliography, but the author index refers to pages on which the very large number of references are given as footnotes. This method of giving references, using small index numbers in the text, is quite the most convenient for the reader. The 38 plates are good, and both these and the figures have been well chosen to illustrate the text. The general appearance of the book is so attractive that anyone interested in the effect of soil conditions on plants will have the greatest difficulty in resisting the temptation to buy it. Those who succumb to the temptation will suffer no regrets.

D.W.P.G.

Reports.

3101. BERMUDA.

Report of the Bermuda Department of Agriculture for 1949, 1950, pp. 27.

Potatoes. Variety "Bliss Triumph" gave the highest yield and resistance to blight in a trial of 16 varieties. *Bananas.* "Black tip" disease, prevalent in July-September, is being investigated. The cause is as yet uncertain. *Vegetables.* The weed killer "Aerocyanate" was successfully used in onion beds.

C.W.S.H.

3102. BRITISH COLUMBIA DEPARTMENT OF AGRICULTURE.

Agricultural Statistics Report. Year 1949, 1950, pp. 52.

These statistics relate to areas of land under various crops and production of crops, animals and animal products in British Columbia. They also present data on the transport of fruit and vegetables and on imports and exports of all agricultural products.

3103. BRITISH GUIANA.

Annual Report (Divisional) of the Department of Agriculture British Guiana for the year 1949, 1950, pp. 46.

The work undertaken by the *Chemistry division* includes a banana soil survey on the Essequibo river, and foliar diagnosis to determine N and P uptake by sugar cane. The *Entomological division* reports on the incidence and control of sugar cane pests, the infestation of coconuts by *Brassolis sophorae*, and damage caused to fruit crops by the coushi ants, chiefly *Atta cephalotes*, and scarring beetles, *Colaspis hypochlora*, attacking the fruit of plantains and bananas. *Sugar Research and Experimentation*: Variety and manurial trials are reported, and cultivation, irrigation and weed control are briefly discussed. *Cane farming*: The report includes details on production, acreages and crop values.

3104. CHILE. (COMPAÑIA CHILENA DE TABACOS.)

Report on year's work of the tobacco grading plant and experimental station, Chagres. Season 1947/48, pp. 25+tables [received 1951].

Tobacco seed beds. Fermate has continued to give very satisfactory results in the control of damping off. *Cultivation experiments*. The removal of suckers was found to have no effect on the yield of the plants. The highest yields were obtained from plants harvested 14 and 21 days after topping. Harvesting in 2 stages resulted in higher yields than a single harvest. Topping the plants when the flower buds were still small resulted in higher yields than topping after the flowers had opened. Increasing the planting distance above that normally used on a given soil type increased the weight of individual plants but decreased total yields. Seed of the first capsule on the inflorescence did not produce higher yielding plants than seed of the other capsules, but germination of the former was better. *Varieties*. The recently introduced No. 33 Orinoco Mosaic Resistant proved very satisfactory as regards earliness and mosaic resistance, and yielded as well as the standard variety No. 36 Paraguay Corriente. Strains No. 58 and 59 of the Paraguay Corrientino group proved to be identical and were the most productive strains in this group. They gave higher yields than the standard variety No. 38 Habano Chagres on poor soil, but lower yields on rich soil on which they did not mature sufficiently early. *Genetics*. Breeding work was continued to develop varieties resistant to mosaic, petiolated varieties and early varieties. Experiments were also carried out for the purpose of studying factors relating to such subjects as distance between leaves and heterosis.

3105. COLONIAL DEVELOPMENT CORPORATION.

Report and Accounts, Colonial Development Corporation, for 1950, 1951, pp. 63, H.M. Stationery Office, London, 2s.

Among the 15 agricultural undertakings financed by the Corporation are projects in British Honduras for growing bananas and ramie, in Dominica for citrus and coconuts, in Malaya for oil palms and cacao, in North Borneo for Manila hemp, in Nyasaland for tobacco and tung, and in Tanganyika for wattle.

3106. COLONIAL RESEARCH COUNCIL.

Annual Report on Colonial Research 1949-50, 1950, pp. 155, H.M. Stationery Office, London, 3s. 6d.

This publication consists of reports of the following organizations: *Colonial Research Council*, mainly administrative; *Colonial Products Research Council*, including work on vegetable oils, plants of possible medicinal and insecticidal value, gums, pyrethrum, and panama disease investigations with bananas; *Colonial Social Science Research Council*; *Colonial Medical Research Committee*; *Committee for Colonial Agricultural, Animal Health and Forestry Research*, including investigations on banana, cocoa, coconut, oil palm, tea, tung, coffee and fibres; *Colonial Insecticides, Fungicides and Herbicides Committee*; and *Colonial Economic Research Committee*.

3107. COMMONWEALTH ECONOMIC COMMITTEE.

Fruit. A summary of figures of production and trade relating to fresh, canned and dried fruit, and wine.

[Publ.] *Commonw. econ. Cttee*, 1950, pp. 116, H.M. Stationery Office, 5s.

The figures mainly cover the war and post-war years up to 1949, although in some cases earlier figures are included. The more important deciduous tree fruits, grapes, pineapples, oranges, grapefruit, lemons, bananas, canned fruits, raisins and currants, dried tree fruits and wine are dealt with. In an appendix details are given of the import duties levied on fresh, dried and canned fruits upon entry into the United Kingdom, Canada and certain European countries.

3108. EAST MALLING.

Annual Report of East Malling Research Station 1950, 1951, A34, pp. 219, illus., 10s.

The present report covers the full financial year from 1 October, 1949, to 30 September, 1950. As in other years it consists of four parts: I. The experimental farm, with details of its working, notes on yields from the various plots, and a brief account of the routine spraying programme. II. A general review of research work with lists of papers published during the year. III. Research reports and reviews covering a wide range of subjects. IV. Bulletins for fruitgrowers. [For papers in III and IV, see separate abstracts.]

3109. GEORGIA.

62nd Annual Report of the Georgia Experiment Station, 1949-50, pp. 92, illus.

The following among much other work is briefly reported: *Peaches*: For the control of plum curculio aldrin, parathion, EPN, dieldrin, and heptachlor proved efficient; trunk sprays against the peach tree borer of a DDT-parathion mixture were also effective. The retarded growth of young peaches planted in old peach orchard soils does not appear to be a simple nutrition or toxicity problem, and for the time being the cause remains unknown. *Pecans*: Good control of pecan weevil was obtained with 4 lb. of 50% wettable DDT plus 1½ lb. sticker per 100 gal. *Grapes*: A 50% yield increase resulted from 8 applications of 4-4-50 bordeaux mixture on Muscadine grapes. *Vegetables*: Trials are reported with sweet potatoes, sweet corn, various beans, peas, lettuce, broccoli, and cucumber.

Tabulated results on the effect of irrigation on 14 vegetables are given. Work is in progress in developing disease-resistant cantaloupes and watermelons. The vegetable weevil, *Listroderes costirostris obliquus*, was most effectively controlled in its larval stage on turnips by 2.5% aldrin, 0.5% parathion, 5% chlordane, and 3% lindane.

3110. HAWAII.

Biennial Report of the Hawaii Agricultural Experiment Station for 1948-1950, Honolulu, 1951, pp. 173, illus.

The following items have been selected from this comprehensive report: *Agricultural Chemistry*: Ammonium thiocyanate, applied as an insecticide or herbicide is toxic to crops; its persistence in 4 types of soils has been established. The survey of cobalt and molybdenum contents of typical soils and plants was completed. *Agronomy*: Of 160 single and top crosses of sweet corn examined, Golden Top Bantam retained its place as the most satisfactory variety. *Entomology*: Intensive study of the Oriental fruit fly (*Dacus dorsalis*) and of its control by chemical and biological methods has continued. Melon fly, *Dacus cucurbitae* and mango weevil, *Cryptorhynchus mangiferae* have been studied; a survey of insect pests in selected orchards has been initiated; and the safe dosage of a number of insecticides for use on fruit crops determined. The efficacy of toxaphene, chlordane and isotox for the control of serpentine leaf miner, russet mite and corn earworm on tomatoes has been established, DDT having proved ineffective against the first-named pest. A new scale was discovered on roses and chemical control was obtained of this and also of the crawler and nymph stages of red wax scale on mango. *Horticulture*: In *Spathoglottis* orchids the genetics of flower colour have been investigated. Optimum cultural conditions for these and other orchids have been established. Plastic wrappers have proved useful for enclosing the rooting medium in the marcotage of litchis. Selection and breeding work on hibiscus, macadamia and papaya continued. *Foods and Nutrition*: A table is given showing the moisture, thiamine, riboflavin and niacin content of a large number of local fruits and vegetables. Freezing trials were successful with guava, mango, litchi and pineapple, but not with papaya. *Plant Pathology*: A virus disease of hibiscus, transmissible by grafting but not by insects or inoculation, has been found. The rooting of carnations has been improved by the addition of an indolebutyric acid-Ferment-talc mixture and post-rooting mortality decreased by soil treatment with chloropicrin and formaldehyde. For tomato leaf blights and spot Zerlate proved the most effective fungicide, while ammonium thiocyanate at 500 lb. per acre was most successful in controlling bacterial wilt. *Plant Physiology*: A promising fumigant "Chlorasol" (75% ethylene dichloride + 25% carbon tetrachloride by volume) has been found for quarantine purposes for orchids; vapour heat treatment prior to export increased the storage life of bell pepper and papaya; and methyl bromide treatment of pineapples for export has also been approved. Work on the persistence of 2,4-D in the soil was continued, and 2 promising new herbicides were investigated. A correlation was shown to exist between potassium content and biennial bearing

of coffee trees. *Vegetable Crops*: In tomato, lines showing resistance to bacterial wilt and tobacco mosaic have been found, seven lines resistant to fusarium wilt, stemphylium leaf spot and spotted wilt have been named and released, and work continued on developing resistance to nematode-gall and a higher ascorbic acid content in fruit. The improvement programme in sweet potato, watermelon, cucumber and other vegetables has been pursued. [See also abstracts 2957 and 3060.]

3111. HONG KONG.

Annual Report by the Senior Agricultural Officer, Hong Kong, for the year ended 31st March, 1950, pp. 31.

The loss of Kam Tin Agricultural Station greatly affected investigations on vegetables, which are now being carried out at the Sheung Shui Station under somewhat restricted conditions. The selection of seeds from Chinese varieties of vegetables has become an important part of the Department's work.

3112. INDIAN AGRICULTURAL RESEARCH INSTITUTE, NEW DELHI.

Scientific Reports of the Indian Agricultural Research Institute for the year 1947-1948, pp. 182, 7s. 6d. [received 1951].

A general report by the director is followed by separate records from the individual Divisions including: *Botany*: Selection and breeding work on potato, tobacco, chilli, safflower, broad bean, tomato, eggplant and lady's finger (*Hibiscus esculentus*) was continued. The genetics of the all-India collection of cultivated brassicas, chillies, *Sesamum* spp. and *Nicotiana glauca* were investigated. Observations on a number of new plant introductions are given. *Sugar cane*: A planting experiment indicated April to be the optimum month for planting the varieties Co.419, 421 and 449. The effect of extra illumination on the flowering date of selected varieties was studied. A list of 30 recommended Coimbatore canes, now released, with their parentage and characteristics, is given. *Soil science*: Methods of determining mineral deficiencies in soils under vegetables were examined. *Entomology*: Field surveys established *Scirpophaga nivella* as the most important borer on sugar cane in Delhi, the incidence of attack reaching 15% in September/December. Methyl bromide was found to be an unsuitable fumigant for cashew, almond and walnuts infested with *Tribolium castaneum*. Dipping cane sets in 5% DDT emulsion or in an aqueous solution of 2% paris green and 4% lime was effective in controlling termite attack, as also was growing the sets in soil treated with 1.25% DDT emulsion at 320 gal. per acre. *Mycology*: The resistance of varieties of cane to red-rot and smut was examined; 34 strains of potato proved resistant to late blight. Latent virus in tomato was studied, and *Nicotiana virus 10* confirmed as the cause of "smalling" disease. Other virus diseases investigated included yellow mosaic of lettuce and a necrosis of potato caused by a mild strain of tobacco leaf curl virus.

3113. INDIAN COFFEE BOARD.

Second Annual Report of the Research Department of the Indian Coffee Board, 1948-49, pp. 54, 1s.

Breeding. Back crossing arabica crosses for yield and

bean quality has been undertaken. Selections were made within the naturally occurring *Devamachy arabica-robusta* hybrids. Season has been shown to have considerable influence within clones on characters such as bean quality. Robusta clone S.274 has easily out-yielded 7 other clones over a period of 5 years. *Propagation*. A method is being tried out in which suckers for single-node cuttings are pre-treated on the tree by "ringing" below each node and bandaging with moss after smearing with cows' urine extract. At Chethalli, cows' urine extract was found to be the cheapest and most efficient hormone source for rooting cuttings. *Manuring*. An experiment conducted over 9 years showed a significant response to a complete fertilizer mixture containing 20 lb. N per acre, though the response was not considered economic in normal times. Higher dressings of N are therefore to be tried. In similar experiments on estates under mixed natural shade no significant results were obtained. In an experiment comparing compost with inorganic manure, responses were also negative. *Pruning*. Light pruning was beneficial in one experiment, but in another pre- and post-monsoon bordeaux spraying was superior to pruning, and pruning itself produced no higher yield than the control. *Weed Control*. Agroxone and Fernoxone were effective against all weeds except *Mimosa pudica*, *Oxalis corniculata* and grasses. A DNOC derivative (Extar Sandoz) as a drenching spray killed all weeds. *Pests and diseases*. Experiments on the use of spreaders with bordeaux sprays against "leaf disease" are continuing and spreaders are proving beneficial. Bordeaux spraying was effective against black rot (*Pellicularia koleroga*). DDT and BHC gave fair protection against the white stem borer (*Xylotrechus quadripes*), the latter being the more efficient.

C.W.S.H.

3114. INDIAN TEA ASSOCIATION.

Proceedings of the 7th Annual Conference of the Indian Tea Association, Tocklai Experimental Station, 1949, pp. 44.

Advisory work, tea manufacture, practical aspects of pest and disease control and future trends of research and advisory work were the main topics discussed.

3115. JOHN INNES.

41st Annual Report of John Innes Horticultural Institution, 1950, 1951, pp. 41, 3s.

Director's report: Bayfordbury was officially opened on 2 June, thus marking the beginning of a new epoch in the history of the institution. Varieties of fruit and vegetables that have been raised are listed. *Pomology department*. Notes are given on tomato breeding, heredity of double flowers, pear scab, potatoes, incompatibility in tree fruits and breeding results with apples. *Genetics department*. The breeding of self-fertile sweet cherries, apples and pears is being attempted; earliness in rogue tomatoes was studied; crossing and varietal contamination in beans and swedes and self-incompatibility in a number of species were studied. *Cytology department*. Chromosome surveys on roses, chrysanthemums, succulents and *Gloriosa* were made. *Garden department*. The artificial illumination of seedlings and its practical effects are discussed. Methods of raising tomatoes and lettuce were examined; observations were made on tomatoes and watercress grown in sand culture. Notes are given on glasshouse construction.

3116. KANSAS.

14th Biennial Report of the Director, Kansas Agricultural Experiment Station, for July 1, 1946 to June 30, 1948, 1948, pp. 106 [received 1951].

This report includes, among other items, brief notes on the following: *Ornamentals*: control of crab grass in lawns; disease control in gladiolus corms and carnations; variety trials with peonies, irises and other herbaceous perennials and annuals. *Vegetables*: the effect of electro-magnetic radiation on tomato plants; variety trials with tomatoes, sweet corn and other vegetables. *Soft fruit*: investigations on strawberries, grapes, raspberries, blackberries and dewberries. *Tree fruits*: the effect of sprays and rootstocks on apple foliage was studied. *Weed control*: extensive trials were carried out. *Pest and disease control* in fruits and vegetables.

3117. KANSAS.

15th Biennial Report of the Director, Kansas Agricultural Experiment Station, 1948-1950, 1950, pp. 122, illus.

Agricultural economics: Consumer preferences for apple, sweet potato and sweet corn packs were investigated. *Plant science studies*: The performance of French crab-apple rootstocks and plum and apricot rootstocks was observed. In strawberries, the value of supplemental irrigation in a dry season was demonstrated; Blakemore proved the most productive variety, and 2,4-D spray at the rate of 1,000 p.p.m. controlled weeds without injury to the plants. The production, propagation and maintenance of ornamentals was studied. The effect of Fermate, 2,4-D, chlordane and parathion on the photosynthetic activity of peach leaves was investigated. Variety trials were carried out on tomatoes, sweet corn and snap beans. *Plant diseases*: The occurrence of yellows virus disease of cherries in Kansas was reported, but rosetting and dieback of infected peach trees was absent. Momentary dip treatment of seed sweet potatoes with Dithane and Phygon XL was effective in preventing black rot, but Spergon was ineffective. Aerial spraying of fruit and vegetables proved most economic in controlling defoliation by cutworm, May beetles and leaf rollers. Control of adult and larval Colorado beetle and plum curculio was obtained with 1½ tablespoonsful of 50% wettable chlordane in 1 gal. water.

3118. KENYA.

Advance Précis of Annual Report of Molo Horticultural Station, Kenya, for 1950, 1951, pp. 2 (typescript).

Apple rootstocks. Gravenstein apples have grown more rapidly on seedling crab than on E.M. XIII or E.M. Immune 10, 12 or 411. In apple rootstock stools the average numbers of rooted plants produced per stool were E.M. Immune 10 11.7, E.M. Immune 12 7.3, E.M. Immune 411 5.4, E.M. Immune C 2.8, and E.M. I 2.6. *Dried fruit*. Both pears and plums have been sun-dried successfully, the latter after dipping in hot sodium hydroxide. *Prolonged dormancy*. The use of oil sprays on apples and plums is now widespread. With varieties naturally resistant to prolonged dormancy there are indications that oil sprays may reduce yields. *Nutrition*. Apples, pears and stone fruits showing symptoms resembling Mg deficiency have not

responded to spray or soil applications of Mg. *Berry fruits*. Among strawberries Melba has proved most successful, though its fruit is of poor quality. Huxley M 44 shows promise and is resistant to leaf spot. Royal Sovereign and Oberschlesien have not been successful. *Vegetables*. Most pea varieties grown for canning or seed did well. The French bean Tendergreen proved very satisfactory, and two Indian onion varieties, Gujrat and Kathiawar, produced small bulbs of good quality. *Other plants* mentioned are hops and Mexican hawthorn.

3119. "DE LANGE OSSEKAMPEN."

Jaarverslag over 1948 van het Centrale Bemestingsproefveld "De Lange Ossekampen" te Wageningen. (A.R. "De Lange Ossekampen" central manurial trial ground, Wageningen, for 1948), pp. 89, illus. [received 1951].

Observations on the weather, incidence of pests and diseases, spray programmes and cultural operations in 1948 are followed by reports on experiments carried out in the 3 apple and pear orchards. In the old orchard trials were made with phosphatic and potassic fertilizers and soil coverage, in the new orchard with increasing amounts of N and lime, and in the experimental plot with various amounts of lime, N, P and K.

3120. LEEWARD ISLANDS.

Report of the Director of Agriculture, Leeward Islands, for the year 1948, 1949, pp. 74 [received 1951].

As a result of extensive sugar cane trials in Antigua the varieties B.4098, B.37161, B.37172 and B.34104 have been recommended for planting on the various soil series. For St. Kitts-Nevis B.37161 has been recommended for general planting and B.41211 and B.34104 for certain areas. Brief notes are given on the results of spacing trials and manurial experiments. Data on varietal distribution at different periods in St. Kitts indicate that the introduction of B.37161 has resulted in an overall increase of cane yields by approximately 30% and of sugar by 20%. In a trial to induce germination of sugar cane setts, overnight soaking in lime water and treatments with 4 disinfectants were about equally effective.

3121. MADRAS DEPARTMENT OF AGRICULTURE.

Reports on the work of the Agricultural Stations in the Madras Presidency for 1947-8, 1950, pp. 656.

Reports on thirty-seven stations are dealt with *seriatim* of which 4 are concerned with fruit and 2 with sugar cane. *Sugarcane Research Station, Anakapalle* (pp. 1-37): Work is recorded on varietal studies, yield trials, experiments on the optimum dates for fertilizer applications and for the harvesting of varieties and juice quality studies. Pests and diseases of sugar cane also received attention. *Pomological Station, Coonoor* (pp. 487-98): Variety, nursery and orchard investigations on apple, plum, pear, peach and persimmon are recorded, while other fruits mentioned are prune, apricot, cherimoya, passion fruit, strawberry, Cape gooseberry, fig, grape, raspberry, blackberry, Japanese chestnut and melon. Small-scale trials of vegetables and insecticidal and drug plants were also conducted.

Burliar Fruit Station (pp. 499-503) reports new introductions of cardamom and pepper varieties, heavy yields of clove and durian, and nursery trials on mangosteen, cinnamon, jack fruit, avocado, durian, breadfruit and cherimoya. At *Kallar Fruit Station* (pp. 505-12) propagation and rootstock trials with mangosteen and mandarin were continued and studies proceeded on jack fruit, papaya, various annonas, pineapple, banana, avocado, durian, cacao, and various spice, medicinal and other economic crops. *Kodur Fruit Station* (pp. 513-28) dealing mainly with citrus, records unsatisfactory yields in rootstock trials owing to disease; and adverse effects on other work of the dry summer. Results of trials of propagating methods with mangoes are tabulated. In tests with lime, kumquat and mango, fruits wrapped in pliofilm showed prolonged storage life. Work at the *Sugarcane Research Station, Gudiyattam* (pp. 529-40) was concerned with varietal studies, yield trials, studies on ripening, and irrigation. Results of a 3-year manurial trial with variety Co. 419 showed that maximum yields were obtained with 200/250 lb. N per acre, but with deterioration of quality; below 100 lb. N per acre, however, the decrease in yield was very considerable.

3122. MAURITIUS.

20th Annual Report of the Sugarcane Research Station, Mauritius, 1949, 1950, pp. 56, 75c.

Variety M.134/32 bred at the station accounted for over 90% of the total cane area of the island in 1949, and was mainly responsible for the peak production of 415,000 tons of sugar. *Cane Breeding*: The breeding programme, aimed at producing special types capable of outclassing M.134/32 on the poor leached soils of the uplands, was continued. A new method of layout in second year trials is described and discussed. *Chemical Division*: Comprehensive fertilizer trials are reported. The value of crushed basaltic rock for the rejuvenation of the exhausted lateritic soils in the high rainfall areas has been confirmed experimentally, but the effective constituents involved have not yet been determined. The *Botanical Division* records further progress in investigation of the chemical control of weeds previously found resistant. A 10% aqueous solution of sodium chlorate has been found effective for a number of weeds, though *Cynodon dactylon* required a 15% concentration, while *Solanum auriculatum* remained unaffected by the chemical. The 2 new hormone-type weed killers Fernoxone and Raphone have proved to be of about equal value to Agroxone. No significant results have been obtained from applications of trace elements. Aretan and Abavit S again gave the best results as growth promoters and fungicides for cuttings. No conclusion could yet be drawn from the experiments on interplanting with food crops. The *Extension Service*, now at full strength, increased its demonstration and lecturing activities, and steps have been taken towards improving the agricultural methods of small planters.

3123. MINISTRY OF AGRICULTURE, LONDON.

Agricultural Statistics, England and Wales, Pt. II. Prices of agricultural produce 1945-47. H.M. Stationery Office, London, 1950, pp. 95, 2s. 6d.

This volume is the second of a post-war series dealing with prices of agricultural and horticultural products.

3124. MINISTRIES OF AGRICULTURE, ENGLAND AND NORTHERN IRELAND, AND DEPARTMENT OF AGRICULTURE, SCOTLAND.
Agricultural Statistics, 1946-7, United Kingdom, Pt. I. H.M. Stationery Office, London, 1950, pp. 49, 1s. 6d.

Acres, yields per acre and the estimated production of various fruits, vegetables and potatoes are included.

3125. MUSHROOM RESEARCH ASSOCIATION LTD., YAXLEY.
Report of the Mushroom Research Station, Yaxley, Peterborough, for the year 1950, 1951, pp. 40, 5s.

Cropping experiments: Increases in yield obtained by adding supplements to stable manure, although profitable, were not statistically significant. The yield from M.R.A. synthetic compost, made in 3 weeks with 1 turn, was not significantly lower than that from stacks made in 4 weeks with weekly turns; unheated stacks outyielded peak-heated ones; spraying with beef extract had no effect on yield. As source of N, dried blood, urea, dried blood + urea and hoof and horn meal were equivalent, hide and leather were inferior and cyanamide was useless. *Microbiology department:* Trials to inhibit truffle spore germination led to inconclusive results, although 0.01% and 0.1% copper sulphate treated compost under certain, at present undefined, conditions allowed mushroom mycelium to grow freely while inhibiting truffle growth. *Disease control trials on commercial mushroom farms:* Both α -naphthol and TMTD appeared to reduce "bacterial pit" slightly in most cases. Results obtained with Parzate, Dithane Z.78 and TMTD on fungal parasites and competitors were conflicting, but some were striking enough to warrant further examination under controlled conditions. It appears that growth of *Sporendonema* can be suppressed by Dithane Z.78 and TMTD.

3126. NATIONAL SHADE TREE CONFERENCE (TILFORD, P. E., editor).
Combined Proceedings of 26th National Shade Tree Conference, Syracuse, N.Y., and 17th Western Chapter National Shade Tree Conference, Long Beach, Calif., 1950, pp. 310.

Papers read during these proceedings cover a wide range of problems of which the following are of horticultural interest: *Soil aeration and tree growth* (pp. 51-8). *Mites on woody plants and their control* (pp. 78-90). A review of the more important tetranychid mites attacking trees, followed by a description of control measures adopted and results obtained at Cornell. *Notes on the possibilities of using antibiotics in controlling plant diseases* (pp. 91-97).

3127. NEBRASKA.
63rd Annual Report of the Nebraska Agricultural Experiment Station for 1949, 1950, pp. 162, illus.

Horticultural Crops (pp. 54-66): *Vegetables and root crops:* The food values of sweet potatoes, squash, tomatoes and potatoes were studied; variety trials

were carried out on peas, lettuce, onions, potatoes, sweet potatoes, tomatoes and muskmelons; the breeding programme to develop a scab-resistant, red-skinned, early-maturing potato variety of good cooking quality continued; and the results of cultural experiments are reported. *Fruit:* Breeding work on apples, strawberries and walnuts is described. During 7 seasons' growth in the orchard, top worked Hiberna increased more rapidly in diameter than Virginia Crab. The possibility of determining the winter hardiness of apple varieties or seedlings by laboratory methods was investigated. Experiments are reported on blossom and fruit thinning, control of apple scab and blotch and cherry leaf spot, and the effect of fungicides on the growth of young apple trees. *Plant diseases* (pp. 67-71): The incidence of diseases in beans, safflower, potatoes and tomatoes is reported and control measures tried are enumerated. *Insect control experiments* (pp. 76-86): BHC reduced but did not control sunflower insects; DDT prevented losses in potatoes due to insect damage, and in one trial 3% DDT in sulphur dust applied at regular intervals resulted in a considerable reduction of leaf roll infection.

3128. NORTHERN NUT GROWERS' ASSOCIATION INC.

Report of the Proceedings at the 40th Annual Meeting of the Northern Nut Growers Association Inc., 1949, Beltsville, Md, 1950, pp. 206 + appendix pp. 30, illus.

Speakers at this meeting covered a wide range of nut problems including materials for insect control, nut trees in relation to roadside plantings, techniques used in breeding and the future of the black walnut industry. [Several papers are abstracted elsewhere in this number.]

3129. NOVA SCOTIA FRUIT GROWERS' ASSOCIATION.

87th Annual Report of the Nova Scotia Fruit Growers' Association 1950, being Proceedings of the Convention held at Kentville, N.S., December 1950, pp. 160.

Among the papers presented is one on fruit research in England with special reference to East Malling. Varietal and cultural studies on red raspberries are reported, the apple breeding project at Kentville is reviewed and marketing problems are discussed. In continued trials Tag and Phygon applied immediately after infection considerably reduced scab on apples, for the control of rust bordeaux-sulphur or bordeaux-ferbam spray schedules are suggested, and the biological control of insects is broadly reviewed.

3130. NYASALAND.

Advance Notes for Annual Report of the Nyasaland Department of Agriculture for 1950, 1951, pp. 3 (typescript).

Lilongwe Research Station. Experiments are reported on grains and tobacco. With tobacco, yield of seed was increased by leaving the head untrimmed but was not affected by leaving the leaves unharvested. *Tung Experimental Station.* Selected clonal material of *Aleurites montana* worked on *A. montana* stock out-yielded the same clones worked on *A. fordii* stock as well as seedlings raised from the same mother trees. In a fertilizer trial started in 1946 on trees planted in

1943, 3 lb. sulphate of ammonia per tree gave significant yield increases, but there has been no response to P and K. Differences are becoming apparent in a cover cropping and intercropping experiment started 2 years ago. In studies on die-back caused by *Botryosphaeria ribis* there has been no evidence so far that pruning out diseased wood reduces the incidence of the disease, but the position of pruning cuts on healthy shoots has proved important in preventing reinfection (they should be clean cuts immediately above a bud or lateral shoot). A mixture of beeswax, paraffin wax, gear oil and bordeaux powder has proved an effective, but expensive, fungicidal wound dressing. *Tea Research Station, Mlanje*. Three new experiments have been started on (1) tipping height, (2) heavy doses of nitrogen and (3) length of plucking round. In an observational plot receiving 30 to 40 lb. N per acre per annum a section shaded by chikwani trees has so far given about 50% more leaf than an unshaded section. A spacing of 40×40 ft. is suggested if chikwani is to be planted as shade for tea.

3131. OREGON.

Oregon's agricultural progress through research, being *Annual Report of the Oregon Agricultural Experiment Station for 1949-50*, issued as *Stat. Bull.* 491, 1950, pp. 165, illus.

The following items are of horticultural interest. *Potatoes*: Treatment of seed-pieces with Phygon and Zerlate against decay was found effective; research was carried out to cut shipping losses; and good control of flea beetles and wireworms was obtained by a number of chemicals. *Hops*: Investigations into the problem of production, breeding, disease control and quality testing were continued. *Speciality crops*: Initial results from test plantings of *Phormium tenax* were promising; good control was obtained of mint flea beetle, strawberry weevil and climbing cutworm damaging mint crops; 14 varieties of safflower grown in trials showed no significant difference in seed yield, but there was considerable variation in oil content. *Weed control*: The use of IPC as the principal chemical, and dinitrophenols and 2,4-D as supplemental herbicides, in strawberries was found effective; in preliminary trials in bulb crops a combination of IPC and potassium cyanate showed promise. *Tree fruits*: Testing of new fruits and nuts continued and the variety collection was further expanded; some 50 virus-like conditions in orchard trees have been studied; a leaf hopper, *Colladonus geminatus*, was found to be a carrier of Western-X little cherry disease. Some of the newer insecticides gave good control of orchard mites and other fruit pests found in Oregon. Elgetol (sodium dinitrocresylate) proved generally efficient as a blossom thinner for apricots. Interest in the wild plum for hybridization, rootstock and fruit production has increased. *Small fruits*: Selections of strawberries and blackberries were made. The growing of Concord grapes in eastern Oregon is considered feasible; hormone treatments were applied to numerous varieties in an attempt to improve berry set, size and time of ripening. Progress is recorded in blueberry trials; wood waste mulches were used on strawberries and vegetables; chemicals were tested for pest and disease control. *Nuts*: Control measures for 2 filbert pests

were tested. *Vegetables*: An extensive research programme involving many hundreds of vegetable varieties and breeding lines has been initiated. Pest and disease control trials are reported. *Nursery*: The potentialities of clonal rootstocks in hastening the productive period of apple orchards have been demonstrated. Of some 60 holly varieties tested for frost resistance the green-stem varieties were the most hardy, the dark-coloured strains less so, and the variegated trees appeared to be the least resistant. Nacconol N-R plus a summer oil emulsion was used in defoliating roses in the field prior to digging without damage to the plants. Control of bulb crop diseases was investigated.

3132. OVERSEAS FOOD CORPORATION.

Annual Report of the Scientific Department, Overseas Food Corporation for 1948-49. Part II. Kongwa, pp. 132.

Though mainly concerned with cultural investigations on groundnuts, some work on sunflower, safflower, castor oil and cassava is recorded.

3133. QUEENSLAND.

Fiftieth Annual Report of the Queensland Bureau of Sugar Experiment Stations, 1949-1950, 1950, pp. 54, illus.

Fertilizer trials. On farmers' properties response to sulphate of ammonia was the rule, but response to P_2O_5 and K_2O depended on the soil type. Response to lime was more nearly related to the lime and magnesia content of the soil than to the soil acidity. *Soil physical properties*. Applications of molasses improved soil tilth. *Weed killers*. 2,4-D at 4 lb. per acre has been found satisfactory as a pre-emergence spray. Contact sprays have been less satisfactory, though creosote-based sprays with sodium pentachlorophenate or 2,4-D added are promising. *Experiment Stations*. The work of individual experiment stations is described. *Cane breeding*. Breeding work was continued, and in a trial of "E" varieties E.275 yielded as well as the standard Trojan and is being multiplied. Ten varieties showed fairly good or good frost resistance. *Pests and diseases*. Satisfactory control of greyback cane beetle (*Dermolepida albohirtum*) has been obtained with BHC mixed with the fertilizers provided this is not placed in direct contact with the setts. Experiments on ratoon stunting disease continue. C.W.S.H.

3134. SARAWAK.

Annual Report of Sarawak Department of Agriculture for 1949, Kuching, 1950, pp. 74.

The Director reports further steady progress in implementing the Department's policy of concentrating on the development of sound stabilized methods of intensive agriculture on the land already cleared of primary jungle, while leaving the remaining areas as reserves or productive forests. Increased plantings of rubber are recorded, and the work of the sago inspection service is outlined. Experiments have shown that cocoa can be grown on a far wider range of soils than was expected. Trials were carried out with derris, pineapple, tobacco, oil palm, coffee, tea, various fibre plants and other crops. Investigations on fertilizer requirements, soil amelioration and farm mechanization are listed. It appears that the heavy rainfall reduces the effect of some of the newer insecticides, and the use

of DDT and BHC types, although initially successful, seems to result in more severe secondary attacks.

3135. SUMMERLAND (PALMER, R. C.).
Progress Report Dominion Experimental Station, Summerland, B.C., 1937-1948, 1951, pp. 101, illus.

Weather records for the past 32 years include a maximum temperature of 104° F. and a minimum of -16° F. The latest spring frost occurred on 8 May, 1922, the earliest autumn frost on 24 September, 1926. The average frost-free period was 179 days, and the average annual rainfall was 10.66 in. and sunshine 1,954.5 hrs. A table showing full bloom dates of tree fruits for the 12 years under review is given. *Fruit breeding and variety tests* are recorded for apple, apricot, cherry, peach, pear, plum, grape and other species of lesser commercial importance, the outstanding varieties produced being Jubilee and Spotlight apples, Spotlight peach, Star and Van cherries, and Reliable apricot. *The selection of suitable rootstocks*: Malling I, II, IX, XII and XVI have been extensively tested and observations are recorded. Hardy framework stocks for tender varieties have been selected and the characteristics of the most promising are described. In pears, Farmingdale, Old Home and Variolosa framework stocks were found resistant to fire blight; Old Home made the strongest stem, and is compatible with commercial varieties. A comparison between mahaleb and mazzard rootstocks for sweet cherries has led to the latter being recommended for the area. *Plant nutrition investigations* included factors affecting apple yields, orchard fertilizer tests, soil erosion, cover crops, and irrigation studies. *Fruit harvesting and storage* and fruit and vegetable processing are dealt with in some detail. *Vegetable crops* have also received attention, and from variety trials carried out a list of recommended varieties from 27 species has been prepared. *Ornamentals*: The preparation and maintenance of lawns is described; annual and perennial border plants, succulents, lilies, roses, shrubs and trees suitable for the district are listed; and the cultivation of geraniums, chrysanthemums and begonias is dealt with.

3136. TANGANYIKA.
Fifteenth Annual Report of the Coffee Research and Experimental Station, Lya-mungu, Moshi, 1948, 1950, pp. 49, 2s. 6d.

Selection. Records of 39 selected trees kept for 11 years showed mean annual yields ranging from 6.5 to 14.4 cwt./acre. A further 11 selections showed higher yields and less variability, yields over 11 years ranging from 12.9 to 18.4 cwt./acre. Seedling progeny of selections were compared in 6 experiments and 7-8-year yields were recorded. Since 1943, 16 clonal selection trials have been planted with rooted cuttings of a large number of clones; 3-4-year yield records have been obtained. Comparisons of clonal material with seedlings from the same mother trees have not yet given definite results. *Propagation*. Softwood cuttings, hard or semi-hard at the base, root most easily, but are not obtainable in sufficient quantity; attempts are therefore being made to improve the technique of rooting true softwood cuttings. Trimming of leaves aided rooting. The best method of cutting was between the nodes.

Cuttings root most easily just after the cool season, i.e. during July to October. Trials are in progress to find the best conditions of shade, watering, etc., for rooting in the hotter months. Peat moss with river sand was found to be the best rooting medium. Vermiculite has so far given varying results. Deaths among cuttings after potting have at times been considerable. Fewer deaths occurred when a potting mixture was used consisting of 3 compost:1 leaf mould:½ fine sand compared with one in which coconut fibre was substituted for leaf mould or with a 4:½ compost-sand mixture. More deaths occurred among slow-rooting cuttings. *Cultivation and manuring*. In an experiment with all combinations of 2 levels of mulch, compost and sulphate of ammonia, 7 years' yields showed that, in combination with the other treatments, (1) sulphate of ammonia depressed yields, (2) mulching with 40 lb. or 80 lb. dried elephant grass per tree depressed yields, (3) compost increased yields. In comparing individual treatments against control, however, both mulching and compost increased yields. *Pruning*. Multiple stem pruning (3 suckers) was shown, from 11 years' yields, to be superior to single-stem pruning or the Agobiada system. *Irrigation*. Irrigation was shown to increase yields. Mulching was included in the irrigation experiment and also increased yields.

C.W.S.H.

3137. UGANDA.
Department of Agriculture, Record of Investigations, No. 1, 1948-9, 1950, pp. 91, 3s.

Potatoes: Results are given of two years' yields of 100 varieties from the Commonwealth Potato Collection. *Sweet potatoes and cassava*: Variety trials have continued. *Coffee*: In a special study of the pest of harvested coffee, *Stephanoderes hampei*, it was shown that, in coffee of under 12% moisture, the pest could not survive over a month. DDT and BHC sprinkled on damp clean coffee killed the insects in their borings. Corky pulp disease is associated with *Stephanoderes*. The relation of *Stephanoderes* to shedding has been studied. *Antestia* spp. continue to be troublesome, and investigations on control with the parasite *Corioxenos antestiae* have shown more hopeful results. *Hydnocarpus laurifolius*: Imported trees have shown an oil content of 67% to 77% of the kernels. *Candle nut* (*Aleurites triloba*): It is suggested that this tree, which bears well and gives kernels with 67% oil, deserves attention as a windbreak, and for coffee or roadside shade.

C.W.S.H.

3138. U.P.A.S.I.
Annual Administration Report, United Planters' Association of Southern India, Tea Scientific Section, for 1949-50, 1950, pp. 27.

Blister blight. Malachite green was found ineffective in controlling blister blight, and Dithane and Fermate were not so satisfactory as the copper fungicides Perenox, Product "1001", Wetcol and Copper Sandoz. These latter were about equally effective, but no fungicide gave complete control even after weekly applications for 6 months. The association of brown blight with blister blight was investigated, and a single

bush remarkably resistant to the latter was discovered and the mechanism of its resistance studied. *Defoliation*. Although defoliated bushes showed deficiency in plant food contents, no significant deficiency of major nutrients was found in the soils carrying them. *Fertilizer trials*. At the Tea Experimental Station, N gave a significant increase of yield at 80 lb. per acre, as did K at 40 lb. and 20 lb., whereas there was no response to P. *Pests*. Steatite was tried out as an alternative carrier for insecticidal dusts, the control of thrips by DDT dusts gave promising results, but a trial of fumigants against eelworm was vitiated by the low incidence of infestation. *Other crops*. Fungal diseases of certain other crops, including coffee and rubber, were identified.

3139. WAGENINGEN (VAN DE PLASSCHE, A. W., AND OTHERS).

Tekst van de voordrachten gehouden op de tuinbouwdagen 12-14 April 1950 te Wageningen. (Text of the papers read on the horticultural days, 12-14 April 1950, at Wageningen.)

Meded. Dir. Tuinb., 1950, 13: 459-751, illus.

Papers covering various aspects of horticulture are grouped under: I. Social-economic problems; II. Breeding and cultivation of horticultural crops. III. Miscellaneous. Some of the papers are abstracted in the appropriate sections of this number.

3140. WEST AFRICAN CACAO RESEARCH INSTITUTE (W.A.C.R.I.).

Annual Report West African Cacao Research Institute, Tafo, 1948-49, 1950, pp. 64, 5s.

Swollen-shoot disease. This report records the support given by an independent international panel of pathologists to the methods recommended by the Institute for controlling swollen-shoot disease, namely, the cutting out of diseased trees. A new virus, causing red pigmentation of the young leaf and transparent lesions, was found in Nigeria. The Ilesha virus of Nigeria was shown to be more virulent than other Nigerian viruses and two Gold Coast viruses. It was shown that swollen-shoot viruses are transmissible from the testae of seeds of infected trees. Experiments were continued on the transmissibility of attenuated and virulent strains of IA virus. Resistance trials were started with a number of imported cacao varieties. In an area used to measure the natural spread of the disease, infected trees increased from 31% to 80%, and moribund or dead trees from 8% to 47%, in 3 years. It was also shown that the percentage of healthy trees becoming infected steadily increased. *Erythropsis barteri* has been shown to be an alternative host plant. Work on mealybug vectors has shown that host plant specificity is of little significance, as about 45% of the plants in an average Gold Coast farm are infected. Dispersal is by wind, ants, individual initiative, and by man. Vector colonies are found at all times, but principally in the dry season. Ant protectors render the effect of local parasites and predators unimportant. Vector density is very variable, and it is suggested that chemical or biological control treatments should be applied where vector density is heavy.

E.605 is the most effective insecticide used against the principal mealy bug vectors, but the practical difficulties in the use of an insecticide in the field still remain. *Capsids*. Experiments on capsid control are described, and DDT painting was found to be most effective. *Soil science*. Sand culture experiments suggested that cacao is a sturdier plant than was supposed, that P deficiency has the greatest effect on growth and that cacao is very sensitive to N and K excess. *Propagation*. Open-air propagation, using a rosette can hourly in place of a continuous mist spray, was unsuccessful. *Breeding*. In 2 progeny trials E.1 progeny yielded best, though comparisons have not been entirely satisfactory owing to soil variation, capsid damage, etc. *Pod diseases*. Spraying with various fungicides against "black pod" (*Phytophthora palmivora*) and "brown pod" (*Botryodiplodia theobromae*) failed to increase bean yields, though infection was reduced by bordeaux and perenox sprays. *Establishment*. Basket plants were superior to both bare root nursery seedlings and seed at stake, though it is pointed out that the first two types of material were seven months older than the seed at stake. Mulching assisted establishment.

C.W.S.H.

3141. WEST OF SCOTLAND AGRICULTURAL COLLEGE.

Annual Report of the West of Scotland Agricultural College, Glasgow, 1949-1950, 1951, pp. 61.

The Auchincruive tomato varieties No. 1a, 4 and 5 have not maintained resistance to cladosporium leaf mould and, as Canadian varieties derived from *Lycopersicon pimpinellifolium* have all shown varying degrees of infection, work has been started with other wild tomato species. The strawberry variety Auchincruive Climax, released in 1947, is becoming the most widely grown variety, though it can no longer be claimed as immune to red core root rot.

New periodicals.

3142. FACULTAD DE AGRONOMÍA, PALMIRA.

Acta Agronomica, 1950, Vol. 1, No. 1, pp. 63.

This journal, published by the Faculty of Agronomy of the National University of Colombia, contains research and review articles, mainly by members of the Faculty, on horticultural and agricultural subjects and soils. A few of the papers have English summaries.

3143. NORDISKA JORDBRUKSFORSKARES FÖRENING AND KUNGL. LANTBRUKSAKADEMIEN.

Acta Agriculturae Scandinavica, 1950, Vol. 1, No. 1, pp. 122, bibls., illus.

The periodical, a sequel to *Acta Agriculturae suecana*, is devoted to the publication of original papers in agricultural research. It is sponsored by the Royal Swedish Academy of Agriculture and the Scandinavian Agricultural Research Workers' Association which is composed of members in Denmark, Finland, Iceland, Norway and Sweden. All contributions are written in English, French or German. Each volume is planned to contain 300-400 pages issued in three or four numbers.

Noted.

3144.

- a *19th A.R. Minist. Agric. Dublin 1949-50*, pp. 189+Appendices, pp. 87, 5s.
- b *A.R. Northern Rhodesia Dep. Agric. for 1949, 1950*, Lusaka, pp. 19, 1s.
- c *84th Report of the Queensland Acclimatisation Society for 1949-50*, 1950, pp. 10.
- d *A.R. Swaziland Dep. Native Land Settlement for 1949, 1950*, pp. 5.

e WISCONSIN.

What's new in farm science, being *Pts. I and II of 65th Annual Report of the Wisconsin Agricultural Experiment Station, 1947/48*, Madison, 1949, pp. 103 and 102, illus., issued as *Bulls. 487 and 489*, and *Pt. I of 66th Annual Report 1948/49*, Madison, 1950, pp. 88, illus., issued as *Bull. 491*. Popular accounts of work undertaken at the Station.